J. H. VAN DEVENTER
President and Editorial Director

C. S. BAUR
Vice-President & General Manager

o o o

Editorial and Advertising Offices
100 East 42nd St., New York 17, N.Y., U.S.A.

O. L. Johnson, Market Research Mgr.
B. H. Hayes, Production Manager.
R. E. Baur, Typography and Layout

o o o

Regional Business Managers

C. H. OBER
New York 17
100 East 42nd St.

H. E. LEONARD
New York 17
100 East 42nd St.

ROBERT F. BLAIR
Cleveland 14
1016 Guardian Bldg.

R. M. GIBBS
Pittsburgh 22
428 Park Bldg.

B. L. HERMAN
Philadelphia 39
Chilton Bldg.

H. K. HOTTENSTEIN
Chicago 3
1134 Otis Bldg.

PEIRCE LEWIS
Detroit 2
7310 Woodward Ave.

D. C. WARREN
Hartford 1, Conn.
P. O. Box 81

R. RAYMOND KAY
Los Angeles 28
2420 Cheremoya Ave.

o o o

Owned and Published by
CHILTON COMPANY
(Incorporated)

Executive Offices
Chestnut and 56th Sts.
Philadelphia 39, Pa., U.S.A.

OFFICERS AND DIRECTORS
C. A. MUSSELMAN, *President*

JOS. S. HILDRETH — Vice-President
GEORGE H. GRIFFITHS — Vice-President
EVERIT B. TERHUNE — Vice-President
J. H. VAN DEVENTER — Vice-President
C. S. BAUR — Vice-President
WILLIAM A. BARBER, Treasurer
JOHN BLAIR MOFFETT, Secretary
JULIAN CHASE — THOMAS L. KANE
G. C. BUZBY — P. M. FAHRENDORF
HARRY V. DUFFY — CHARLES J. HEALE

o o o

Member, Audit Bureau of Circulations

Member, Associated Business Papers

o o o

Indexed in the Industrial Arts Index. Published every Thursday. Subscription Price North America, South America and U. S. Possessions, $8; Foreign, $15 a year. Single Copy, 35 cents.

o o o

Cable Address, "Ironage N. Y."

o o o

Copyright, 1944, by Chilton Company (Inc.)

This Week in The IRON AGE

Vol. 154, No. 13 — September 28, 1944

Editorial

Preserving the "Know-How" 37

o o o

Technical Articles

Method Simplification Applied to Time Study 40
File Costs Halved by Reclamation 45
Surface Preparation for Spot Welding Aluminum 46
Relationship of Brinell Hardness and Yield Stress 50
Soap Aids Wire Drawing 53
Chemically Treated Steels for Food Cans 54
Vacuum Test Pit for Impellers 58
Welding at the Battle Front 59
Krause Reciprocating Mill Used In Brass Rolling 60
Precision Work on Old Lathes Permitted by Attachment 63
New Equipment 64

o o o

Features

News Front 39
Assembly Line 68
Washington 72
West Coast 76
Personals and Obituaries 80
Fatigue Cracks 82
Dear Editor 84
This Industrial Week 86
News of Industry 89

o o o

News and Markets

Reconversion Charted 102
Alloy Steel and Specifications Endorsed 104
Postwar Plan Offered by Metal Trades Group 110
Postwar Planning Competition Contest 114
Aircraft Contract Terminations 118
Re-employment of War Veterans 122
Aluminum and Copper Cutbacks 132
Plate Shipment 132
Machine Tool Market Developments 138
Non-Ferrous Metals News and Prices 140-141
Iron and Steel Scrap News and Prices 142-143
Comparison of Prices by Week and Year 144
Finished Iron and Steel, NE Steel Prices 146
Warehouse, Semi-Finished, Tool Steel Prices 148-149
Steel Pipe, Tubing, Wire Products, Prices 150-151
Pig Iron and Coke Prices 152-153
Stainless Steel and Ferroalloy Prices 154-155

o o o

Index to Advertisers 221

THERE ARE PLACES FOR BOTH . . .

Firth-Sterling, long specialists in making steels for shop tooling, early recognized the possibilities of carbides as a means of extending the improvement in shop practice brought about by the super high-speed steel—CIRCLE C. **But, there is a place for both . . .**

Where the highest speeds are obtainable or materials are hardest, FIRTHITE is the "last word" in a cutting material. It is used at speeds up to ten times those possible with high-speed steels. Where speeds above average are permissible or materials are "on the hard side," CIRCLE C will cut *at least* 25% faster than ordinary grades of high-speed steel. Send for descriptive literature on these remarkable materials.

For instance:

FIRTHITE *removes* 730 pounds of gray-iron casting metal per hour instead of 180 pounds;

drills a gun barrel in 23 minutes instead of 1 hour;

enables milling-cutters to run at 1,000 feet per minute instead of 100 feet with previous materials.

For instance:

CIRCLE C *machines* hard die blocks in 28 hours instead of 42 hours . . . doubling production between grinds — versus regular high-speed steel;

turns two to ten times more pieces of heat-treated alloy steel between grinds than other high-speed steels.

See the Firthite Movie to be shown in Booth No. B-146 at the National Metal Congress, Cleveland, O., Oct. 16 to 20, inc.

Firth-Sterling Steel Company

Offices: McKEESPORT, PA. NEW YORK - HARTFORD - PHILADELPHIA - CLEVELAND - DAYTON - DETROIT - CHICAGO - LOS ANGELES

The
IRON AGE

ESTABLISHED 1855

o o o

Sept. 28, 1944

o o o

J. H. VAN DEVENTER
President and Editorial Director

C. S. BAUR
Vice-President and General Manager

o o o

A. H. DIX
Manager, Reader Service

o o o

Editorial Staff

Editor .....T. W. LIPPERT
Technical Editor .....F. J. OLIVER
Commercial Editor, T. C. CAMPBELL

o o o

Associate Editors
F. J. WINTERS
J. W. TRUNDLE
J. ALBIN
JOHN ANTHONY
S. H. BARMASEL

Editorial Assistants
M. M. SCHIEN
G. B. WILLIAMS
H. W. VAN CAMP
C. R. MUNZER
J. P. O'CONNOR
E. O. MILLER

Regional News and Technical Editors
T. E. LLOYD
Pittsburgh 22
428 Park Bldg.

C. T. POST
Chicago 3
1134 Otis Bldg.

L. W. MOFFETT
DONALD BROWNE
EUGENE HARDY
Washington 4
National Press Bldg.

S. H. BRAMS
Detroit 2
7310 Woodward Ave.

OSGOOD MURDOCK
San Francisco 3
1356 Market St.

Editorial Correspondents
ROBERT McINTOSH
Cincinnati

L. C. DEAN
Buffalo

G. FRAZAR
Boston

HUGH SHARP
Milwaukee

F. SANDERSON
Toronto, Ont.

R. RAYMOND KAY
Los Angeles

JOHN C. McCUNE
Birmingham

ROY M. EDMONDS
St. Louis

JAMES DOUGLAS
Seattle

Preserving the "Know-How"

THERE is a very true couplet that bears thinking about today, which runs as follows: "For all sad words of tongue or pen, the saddest are these 'it might have been!'" Also there are some pertinent and related sayings with respect to the two letter word "if."

If Germany and Japan had realized the potential military might of those two pacific nations, England and the United States, there would have been no world war. But how could they have conceived that totally unprepared countries, with ridiculously small standing armies, with an almost complete lack of citizen training for war or for manufacturing for war could be anything but "pushovers" for a fast moving, well prepared blitzkrieg?

So in line with this thought or rather this conviction that preparedness is the best war prevention, it is proposed that we adopt universal military training. I hope that we shall and that we will not be simple minded enough to emasculate the military part of it, as some sincere but misguided war haters would have us do.

Universal military training of youths of 18 would prevent almost any possible future war and would shorten any war that did happen by at least a year, provided this precautionary non-aggression insurance is accompanied by a well planned preservation of the technical know-how of munition making. For standing armies are just that, and no more, unless they are equipped with the latest and best weapons. A standing army never won any more wars than could a sitting one.

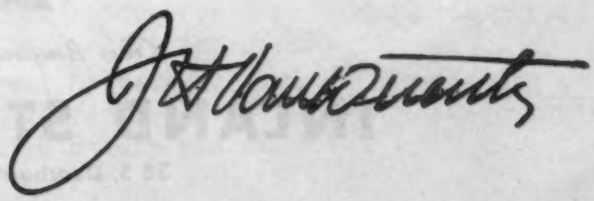
Of course some people who believe that a blueprint for perpetual peace will emerge from the legislative machine on V-day will say "why go to all of that bother and expense when a small world police force will do the trick?" Building a world police force is certainly a bigger task than building a police force for the city of London or New York, and it would take quite a few years to start from scratch and do that. It will probably be 10 years before we can hope to have one in smooth running order.

In the meantime, preparedness should be our watchword. Preparedness both as to manpower and the knowledge of how to make things. Universal service will insure the former. I think that you manufacturers of war materiel could provide the latter.

Of course, you are experts now in the know-how. But even expert knowledge fades away when exposed unused to the passage of time. And you cannot go on piling up munitions when peace calls upon you for its normal demands.

So the thing to do is to get your experience down in black and white while it is fresh. Write a detailed history of the problems that were presented to you and the ways in which you solved them and how you would perhaps go about solving them better if a next time comes.

Some of our larger concerns and some of the smaller ones too are doing just that. Every manufacturer who has had a contract or subcontract should do it also. It will be invaluable if ever needed; if not, a valuable addition to the history of accomplishment.



One of Inland's mills cold reducing enam iron strip which will later be cut into

Inland "*Texturized*" Enameling Sheets

Blasted hardened steel rolls give Inland Enameling Sheets a special "texturized" surface—and to assure uniformity of surface, rolls are frequently changed.

The effect of this Inland method of processing is to increase surface area which promotes controlled chemical reaction by some of the iron and enamel to form a zone of enamel and iron "alloy," which "welds" the coat to the base metal. Another important effect is to form innumerable microscopic talons, which provide mechanical bond by projecting into the enamel and the iron alloy zone. The result is, Inland Enameling Sheets take a "double" grip on enamel—by chemical bond and by mechanical keying. These "texturized" enameling sheets assure shorter firing time, lower firing temperature, and more durable enameled products.

An Inland specialist is ready now to help you take full advantage of Inland Enameling Sheets. He will help you with design, forming and enameling problems.

Write for Bulletin

Keep Buying More War Bonds

INLAND STEEL COMPANY

38 S. Dearborn St., Chicago 3, Illinois

Sales Offices: Cincinnati • Detroit • Kansas City • Milwaukee • New York • St. Louis • St.

The IRON AGE

September 26, 1944

NEWS FRONT

► Using Buffalo as a test area for its survey of postwar employment, the Bureau of Labor Statistics forecasts serious unemployment for big war production cities after the elimination of war contracts.

As many as 50,000 may be thrown out of work in Buffalo, BLS predicts, unless new civilian industries come into the city. Most obvious candidates for unemployment are women and aircraft workers.

► A study of French transportation needs is now being conducted in Paris under the supervision of the Foreign Economic Administration.

Within the next three weeks the French Supply Council will take bids for 700 locomotives of the 2-8-2 type and 200 diesel-electric locomotives. In addition, it is expected that the French will ask for about 74,500 freight cars, a figure that likely will be materially reduced by the FEA.

► The Brassert-built Republic Steel Corp. sponge iron plant at Warren, Ohio, will definitely go into production sometime between Oct. 1 and Oct. 10. The 10-day drying-out period is now about completed, after which a few days will be needed to purge the equipment.

► In the foreseeable future, the airplane will carry the majority of long-distance passenger traffic, according to Jack Frye, president of TWA. Traffic to the Far East will be very heavy, and will be serviced by U. S. and British airlines.

But: The railroads are pointing toward capture of the bulk of internal passenger traffic. Passenger revenue in 1933 was $330,000,000, and in 1943 had risen to $1,656,867,958. This latter figure is of such magnitude that even the railroads have reversed their usual contempt of passengers as a revenue source, and to retain this business are adopting a long-range research on trucks, seats, lights, air-conditioning, interior treatment and speed.

And: For freight, the war has brought welded freight car construction to a high state of perfection, which along with low-alloy constructional steels promises great reduction in weight. This trend likely will prevent any wide-scale adoption of light metals for freight car construction, despite a recent Burlington coal hopper car of aluminum and hollow steel axles, which dropped the weight 7900 lb. to 36,800 lb.

► A comparatively new firm, of which Wendell Kinney of Los Angeles is president, has been among the first in the Pacific Southwest to be approved for reconversion to civilian goods, with WPB and WMC spot authorization to inaugurate the manufacture of aluminum household utensils at hitherto leisurely and non-industrial Santa Barbara.

► Not much attention has been given to the announcement of Lockheed Aircraft Corp. that P-38 Lightning production will be cut back to make way for a new and still restricted (censors) fighter. What this fighter is will soon be broken by some Army official or by some Congressman who won't be able to resist a headline.

The subsequent wave of publicity on this new fighter probably will exceed that of the Bell-GE twin-engine jet fighter, which holds the record for coverage in the technical and general press.

► Plastic ferrules for pencils (the little top on the pencil which holds the eraser) will be retained after the war, according to the American Lead Pencil Co. It is said that they are quicker and cheaper to manufacture and assemble than metal, and are brighter and have a wider color range.

► Navy and West Coast industrialists have become desperately worried over the large exodus of war workers. With less than 10 per cent of the West Coast productive effort devoted to the European battlefront, the marked letdown in morale and production presents serious problems in the battle of the Pacific and Japan.

► Disabled veterans will be employed in Great Britain according to mandatory quotas set for each industry. Lighter industries have received the larger quotas. Physical restoration and rehabilitation will be provided before placement.

Method Simplification Applied to Time

VERY frequently the time study engineer, in discussing job problems with the foreman, or in suggesting changes in the job setup, is asked to compute the increase or decrease which will take place in cost per piece or rate of hourly production as a result of his recommendations. In many instances, he may know the standard time per piece with the existing method and be able to estimate the probable time per piece with his proposed method. He must be able to answer such questions as:

"How will this change in time per piece affect the rate of hourly production?"

"How will the change affect the unit cost?"

In many other cases, the time study engineer may have available the existing rate of production and wish to make a quick comparison between the existing and expected rate of production on the new job setup. In all of these instances, it is important that the time study engineer be able to compute these relationships and changes easily and quickly, without the necessity for elaborate computations. The time study engineer who can give the foreman quick and accurate answers to his questions, as they are asked, is much more likely to sell his proposal to the foreman and leave with him the impression that the time study engineer really knows his business.

None of the relationships mentioned are really difficult to solve. Almost any time study engineer can easily compute the various factors involved. However, it has been found in most instances, that the time study engineer will have to make detailed computations to arrive at the several required facts, so that he may be able to compare them in terms of percentage of increase or decrease. These computations are quite often lengthy and sometimes fairly involved. Through the use of simple formulas, the relationship between time per piece, production per hr., and direct labor cost per piece, may easily be shown with a minimum of computation. For the most part, a single setting of the slide rule is all that is required.

Probably the questions which the time study engineer is most frequently called upon to answer in discussions on the floor have to do with the changes that take place in the rate of hourly production when the unit time required to complete the job in question is altered. The following three formulas should cover most of the problems the time study engineer will encounter in calculating the per cent of change in hourly production when the standard time is increased or decreased:

Formula A:

$$\frac{\text{Amount of change}}{\text{New standard time}} = \text{Per cent of change in hourly production.}$$

Formula B:

$$\frac{\text{Present standard time}}{\text{Proposed standard time}} = \text{Per cent that new production will be of present production.}$$

Formula C:

$$\frac{\text{Per cent of change in standard time}}{100\% \pm \text{per cent change in standard time}} = \text{Per cent of change in rate of production.}$$

For example, on a job where the standard time is 0.10 min. per piece and where a change is contemplated which will increase the standard time by 20 per cent to 0.12 min. per piece, it may be desired to calculate quickly the per cent of decrease that will take place in the hourly production as a result of the change. Instead of determining what the hourly production would be with the standard time of 0.10 min. and what the production would be with the standard time of 0.12 min., the two may be compared by calculating the per cent of change that will take place in the hourly production. This may be obtained in one setting of the slide rule by applying Formula A. The amount of change is 0.02 min.

$$\frac{0.02 \text{ min.}}{0.12 \text{ min.}} = 16.66 \text{ per cent.}$$

The per cent of decrease in the rate of production, when the standard time per piece is increased 20 per cent, will therefore be 16.66 per cent.

Consider another illustration in which the standard time is being increased by an additional percentage of allowance. Here again, rather than go through the complete computation to determine what the new standard would be, through the use of Formula C, a single setting of the slide rule suffices to give the answer.

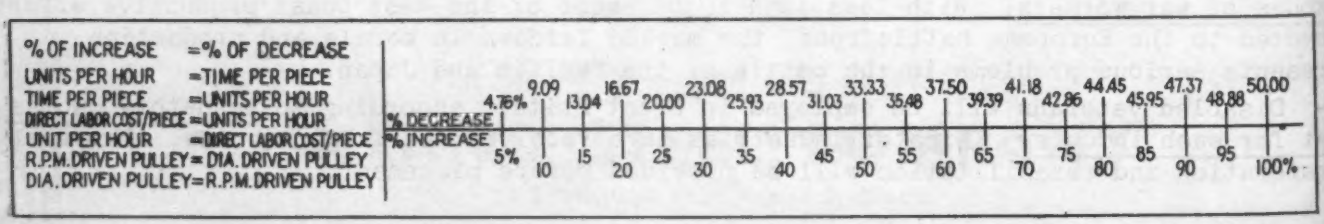
Practical Applications

For example, if the standard time is being increased by 25 per cent to determine the per cent of change in the hourly production:

$$\frac{25 \text{ per cent}}{125 \text{ per cent}} = 20 \text{ per cent.}$$

o o o

FIG. 2—Scale showing the relationship between the terms of an inverse ratio.


% OF INCREASE =% OF DECREASE
UNITS PER HOUR =TIME PER PIECE
TIME PER PIECE =UNITS PER HOUR
DIRECT LABOR COST/PIECE =UNITS PER HOUR
UNIT PER HOUR =DIRECT LABOR COST/PIECE
R.P.M. DRIVEN PULLEY = DIA. DRIVEN PULLEY
DIA. DRIVEN PULLEY = R.P.M. DRIVEN PULLEY
% DECREASE
% INCREASE
4.76% 9.09 13.04 16.67 20.00 23.08 25.93 28.57 31.03 33.33 35.48 37.50 39.39 41.18 42.86 44.45 45.95 47.37 48.88 50.00
5% 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100%

Study . . .

o o o

By DAVID ANDERSON
Industrial Engineer, and
ARTHUR H. HANSEN
Head of the Standards Department, Bulova Watch Co., Woodside, N. Y.

o o o

. . . Many of the calculations which the time study engineer is most frequently called upon to make concern changes in the rates of hourly production when the unit time required to complete a given job is altered. To facilitate such computations, the authors offer three simple formulas and two charts which make for quick and easy determinations. A previous article on personal and machine allowances, entitled "The Right and Wrong of Time Study Calculations," appeared in THE IRON AGE, Aug. 17, 1944, page 61. A third article on the proper determination of the leveling factor in time study will appear shortly.

The per cent of change in rate of production is, therefore, 20 per cent.

Another type of computation which the time study man is frequently called upon to make, concerns the per cent of change in direct labor cost, when the rate of hourly production, or the standard time is increased or decreased.

Formula A:

$$\frac{\text{Present hourly production}}{\text{Proposed hourly production}} = \text{Per cent that new direct labor cost will be of present.}$$

Formula B:

$$\frac{\text{Proposed standard time}}{\text{Present standard time}} = \text{Per cent that new direct labor cost will be of present.}$$

It should be noted that Formula A divides present by proposed production, whereas Formula B reverses the relationship and divides proposed time by present time. This is due to the fact that the relationship between unit time and rate of production is inverse, and as the unit time goes up, the hourly production goes down.

Where the present direct labor cost is known and the hourly production is being increased or decreased by a given percentage, the new cost may be calculated in one setting of the slide rule.

$$\frac{\text{Present direct labor cost}}{100\% \pm \text{Per cent of change in hourly production}} = \text{New cost,}$$

For example, if the present rate of hourly production is 600 pieces per hr., and the unit cost (direct labor) is 0.00166, and as a result of job improvement the hourly production is increased 25 per cent, the new unit cost will be:

$$\frac{0.00166}{125\%} = 0.00133.$$

The direct labor cost on the proposed rate of production will be 0.00133.

All of the above calculations are based on a very simple premise, namely, that the relationship between the time required to complete a task and the number of identical tasks which can be completed in any given time, is a simple inverse relationship. As the time required per unit goes up, the number of units completed per hr. goes down; for any given per cent of change in the time per unit, the per cent of change in the opposite direction in the units per hr., is always fixed. However, it should be remembered, that while this per cent of change is fixed, the percentage of change in one direction is not equal to the percentage of change in the opposite direction. This is clearly understood when it is realized that in an inverse proportion the term which is being increased can be increased by an unlimited percentage; the term which is decreased, however, can never be reduced by more than 99.999 per cent. If it is reduced by 100 per cent or more, nothing remains.

Since these relationships are fixed, it will always be found that if the time per unit is increased by 25 per cent, the effect on the units per hr. will always be a decrease of 20 per cent. If the time per unit is increased by 33 1/3 per cent, the effect on the units per hour will always be a decrease of 25 per cent. Similarly, if the units per hr. is decreased by 20 per cent, the direct labor cost per piece, all other things being equal, will be increased by 25 per cent.

The following simple rules may therefore, be established:

(1) A given per cent of change in time per unit always results in a direct and equal per cent of change in the direct labor cost per unit.

(2) A given per cent of change in time per unit always results in an inverse change of a fixed but unequal per cent of change in units per hour.

Fig. 1 illustrates a simple chart which has been found very valuable in showing these relationships for all conditions. By means of this chart it is possible to determine at a glance what per cent of change in hourly production will result from a given per cent of change in unit time, and what per cent of change in direct labor cost will result from a given per cent of change in the units per hr.

Time, Production—Inverse Ratio

These figures covering the rate of change which takes place between the terms of an inverse proportion, hold true not only on problems involving time and production relationships, but on all problems where simple inverse ratios are involved. The ratio between the diameter of a driven pulley and its revolution per minute, for example, is a simple inverse ratio. As the diameter of the driven pulley is decreased, its revolution per minute is increased, and vice-versa. To determine the change required in the diameter of the driven pulley in order to achieve a given change in revolution per minute this formula is often used to give the answer in a single slide rule setting.

$$\text{Present diameter of driven} \times \frac{\text{Proposed rev. per min.}}{\text{Present rev. per min.}}$$

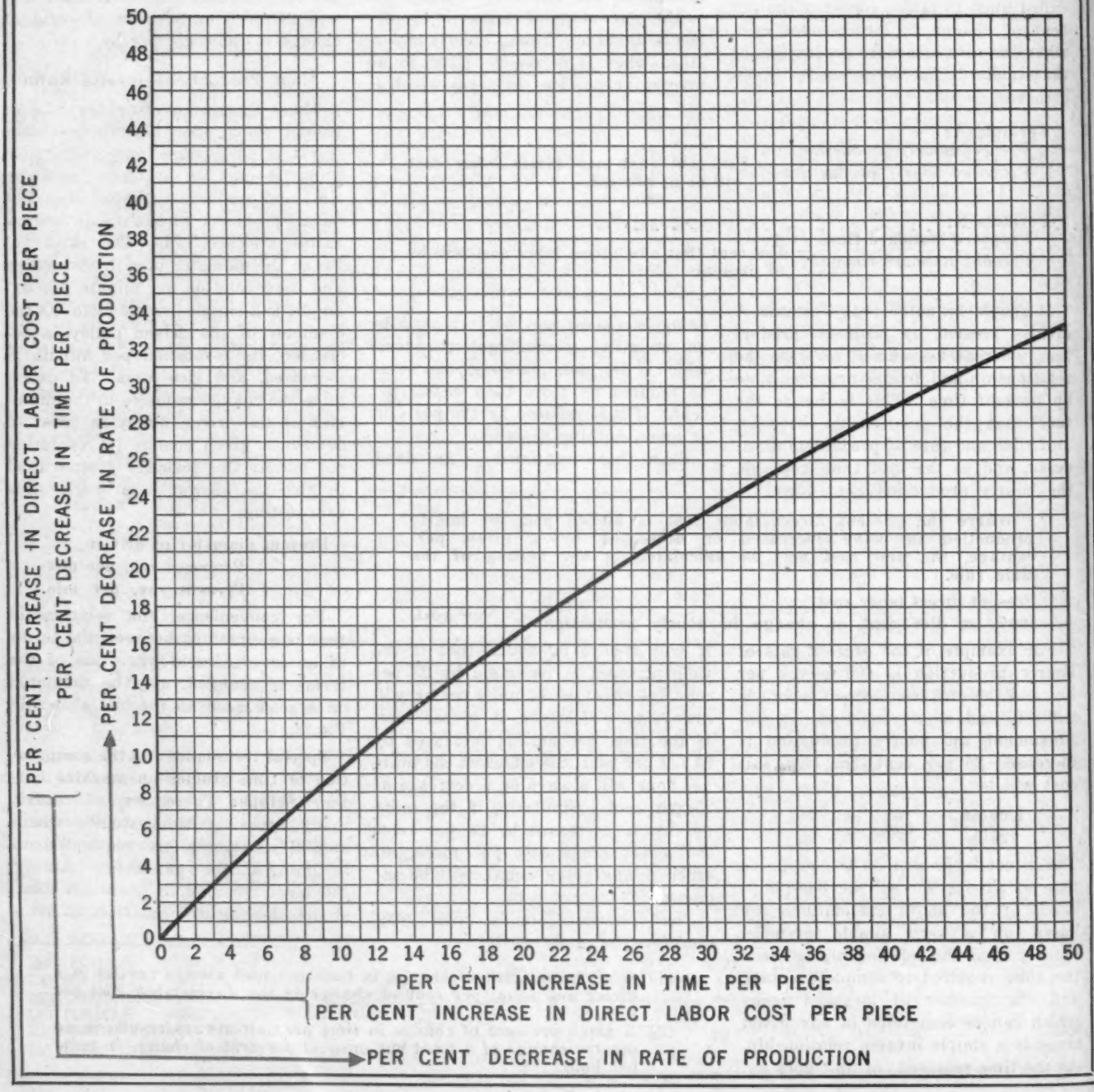
For convenience, the relationship that is maintained between the terms of an inverse ratio when one of the terms is changed, may be tabulated on a scale such as the one shown in Fig. 2.

Special techniques for the computation of time studies on machine battery Setups: There are, of course, many types of time studies where special techniques are required both in timing and in computation. Among the most common of these are time studies dealing with batteries of semi-

Relationship Between Time Per Piece Rate of Production Direct Labor Cost Per Piece

o o o

Fig. 1. By the use of this chart, it is possible to determine at a glance both per cent changes in hourly production when given the per cent change in unit time and per cent changes in direct labor cost when the per cent of change is given in units per hr.


PER CENT DECREASE IN DIRECT LABOR COST PER PIECE
PER CENT DECREASE IN TIME PER PIECE
PER CENT DECREASE IN RATE OF PRODUCTION
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
PER CENT INCREASE IN TIME PER PIECE
PER CENT INCREASE IN DIRECT LABOR COST PER PIECE
PER CENT DECREASE IN RATE OF PRODUCTION

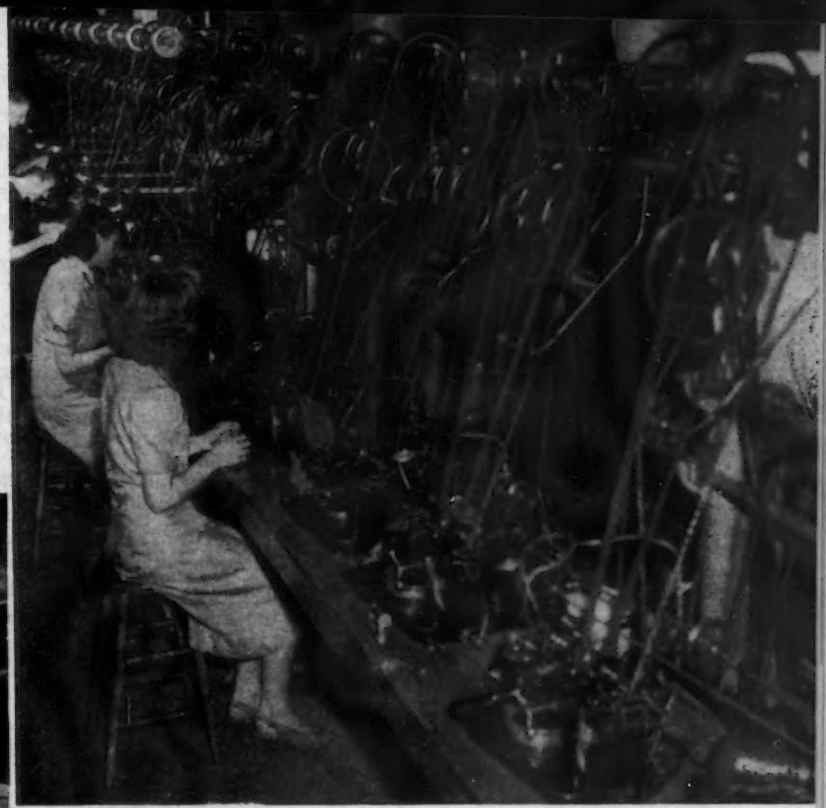
RIGHT

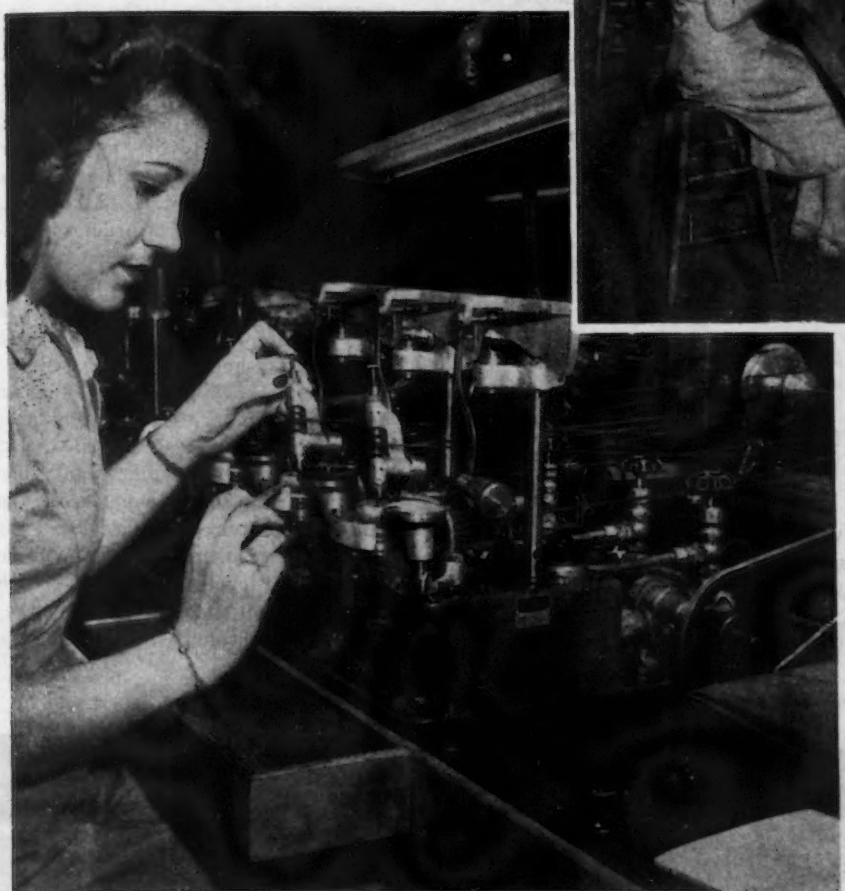
FIG. 3—A battery of Petermann screw machines cutting 282 threads per in. on 0.0216 diameter wire stock.

o o o

BELOW

FIG. 4—Operator utilizing three work stations to do precision fine grinding and polishing with diamond tip tools.





automatic equipment where one operator moving successively from machine to machine, is required to feed several machines.

In setting up a standard for such a battery, there are several things that should be borne in mind. It is not necessary to time an indefinite number of complete battery cycles in order to determine the cycle time for each machine and for the battery. If it is remembered that the total cycle for each machine in the battery is always equal to the cycle of the machine with the longest cycle, the process of making a time study on such a battery will be tremendously simplified. The most efficient setup on such work is, of course, to have each battery comprised of machines whose cycle time is the same. On such a setup, if the correct number of machines has been assigned to the operator, there should be no operator idle time and no machine idle time. Both the operator and the equipment will be running at 100 per cent efficiency. However, under actual production conditions, that is not always possible. The following formula provides a very simple method of determining the number of machines that could be assigned to one operator, and still operate at maximum machine performance.

$$\frac{\text{Machine time} + \text{Feed time of slowest machine}}{\text{Feed time} + \text{internals}} = \text{Number of machines.}$$

The answer arrived at will be the number of machines that could be handled efficiently by one operator. However, before actually assigning this number of machines to one operator, there is one other factor that should be considered. On a large battery, the time required by the long travel from the last machine back to the first machine is often significant, and must be considered. The allowance for this is very simple. The time required for the long travel is expressed as a percentage of the feed time. That is, if the feed time is 0.20 min. and the time required for the long travel is 0.20 min., it is 100 per cent, or equivalent to the operator time required by one machine. Therefore, one machine less than indicated in the answer is assigned. If the time for the long travel is 0.10 min., it is 50 per cent, or equivalent to ½ the operator time required for one machine. Therefore, ½ machine less than indicated in the answer is assigned.

It is of paramount importance that the proper number of machines be assigned to an operator if anything approaching full utilization of equipment and personnel is to be achieved. If more machines are assigned, there will be no increase in the total output and the capacity of the additional machines will be wasted. The additional machines will merely create idle machine time on all of the machines in the battery. If fewer machines are assigned, there will be operator idle time during each cycle of the battery.

The treatment and computation of allowances on machine battery setups often involve special considerations not generally encountered in most other types of time study. In most

machine batteries there are generally four types of allowances which must be made:

(1) **Items of allowance such as tool change and sharpening by supervision; where machines are "down" successively.**
(2) **Items of allowance such as warming up equipment, oiling, greasing and cleanup, by the operator; where all machines are "down" simultaneously.**
(3) **Special allowances for batteries where several parts of varying lot sizes are being machined, often on an unequal number of machines. Time must generally be allowed for replacing lots or series. This calls for a special computation, if it is to be accurately allowed for. The usual method of making the allowance generally results only in an approximation, and sometimes creates a significant error in the standard.**
(4) **Fatigue, consistency and incentive allowances. These should be based on a consideration of the relationship between the operator cycle and the machine cycle.**

Allowances for Items 1 and 2 are simple to calculate. All that need be remembered is that when machines are "down" successively, only a part of the productive capacity of the line is lost. The effect of this loss may be calculated by the formulation:

Amount of time lost x per cent of battery involved in loss = Amount of allowance.

For example, a 1 hr. loss of time on one machine out of a battery of five machines, should be allowed for by the computation:

1 hr. x 20 per cent = 0.20 hr. (12 min.)

Thus, the total allowance for the battery to cover a 1 hr. loss on one machine in the battery is 12 min.

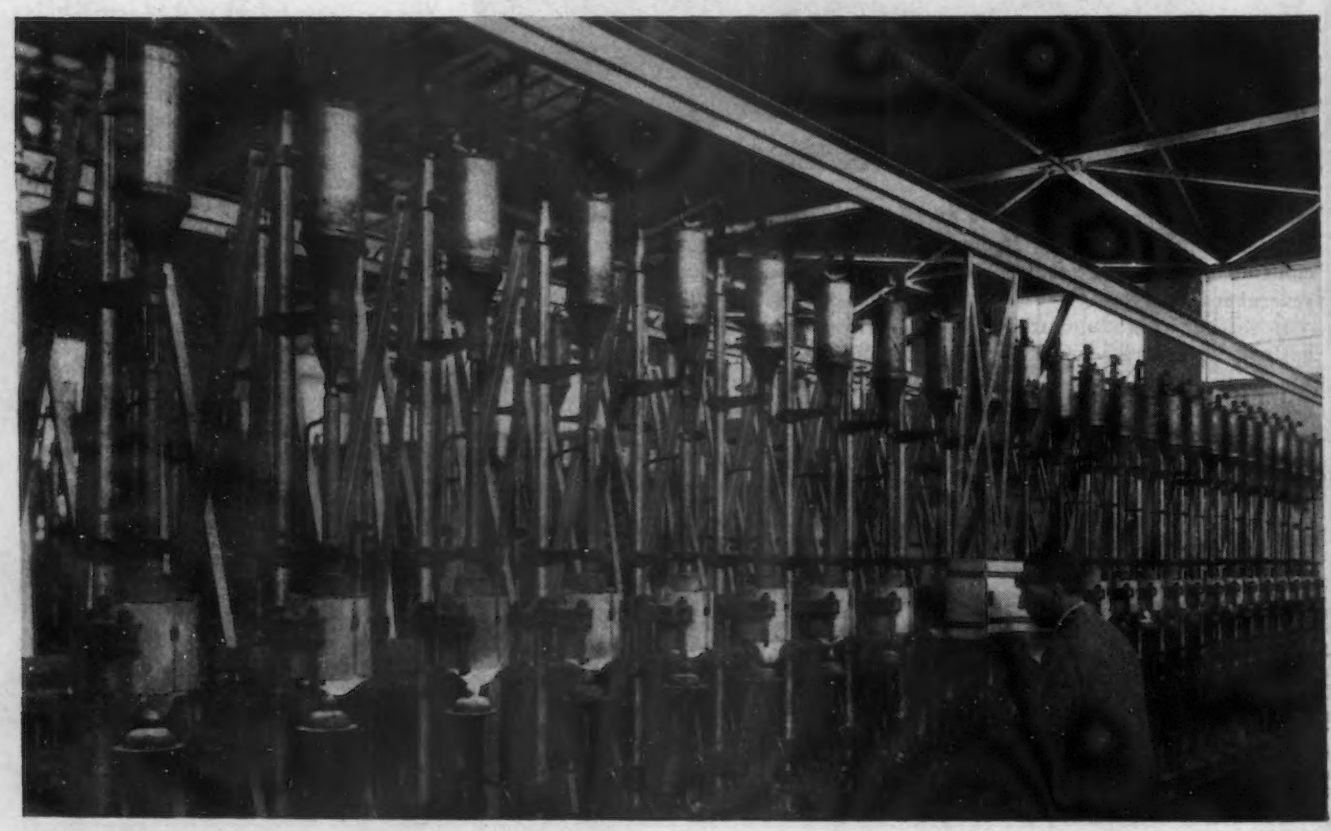
The computation of the time to be allowed on Item 3, for a series or lot replacement on a battery machining several parts of varying lot sizes, generally presents a difficult problem to most time study men. The usual procedure is to attempt to compute the amount of time required to complete a series of a given part. The allowance is then made by allowing the required number of minutes per replacement for each replacement, and pro-rating this over the entire series. This is repeated for each part.

This procedure contains a serious fallacy. The entire battery must stop when one lot is completed, so that the operator may gather up the finished work and replace it with a new series.

The time to complete a series of any one part, therefore, includes the time required to replace that particular series, plus the time required to replace any other series in the battery that may have been completed while that particular series was still in process. The problem resolves itself into making the proper allowance for time lost in replacing series on every other part being machined in the time standard for each individual part. This can only be done by expressing the time lost through replacement on each part in terms of some common factor, so that the replacement time for all the parts may be added, and the sum allowed on each part being machined.

As has already been mentioned, on a battery where the machines are being fed successively by the operator, the total cycle time per piece is the same for each machine. All that is necessary, therefore, in order to compute the allowance for series replacement, is to determine the number of cycles which the battery will have to make to complete one series on each part being machined. This will be different for each part, depending on the size of the series and the number of machines assigned to that part. By pro-rating the replacement time per series (on each part) over the number of battery cycles required per series, the resulting answer will be the time per cycle required for each replacement on that part. This is repeated for each part. Since all of the

Fig. 5—One operator tending 40 furnaces manufacturing synthetic sapphire boules.



machines are stopped every time any series is replaced, the sum of each of the answers added to the cycle time for each part is the allowance for series replacement.

This may be formularized:

Per cycle allowance for changeover equals the sum of the replacement time per series for each part divided by the number of battery cycles required to complete a series of that part.

For example:

On the following battery the computation would be made as follows:

Machines in battery 6
Distribution of Machines:
1 and 2 on Part A with.....**1000 pieces per lot**
3, 4, and 5 on Part B with.....**1800 pieces per lot**
6 on Part C with.....**1200 pieces per lot**
Series Replacement Allowances:

	Series Replacement Time Allowed / No. of Cycles to Complete Series
Part A (Machines 1 and 2)	$\frac{5.00 \text{ min.}}{500 \text{ cycles}} = 0.01000$
Part B (Machines 3, 4, 5)	$\frac{600 \text{ min.}}{600 \text{ cycles}} = 0.01000$
Part C (Machine 6)	$\frac{5.00 \text{ min.}}{1200 \text{ cycles}} = 0.00416$

0.01000
0.01000
0.00416
0.02416 min.

The allowance for series replacement is 0.02416 min. per cycle.

Another important consideration on battery setups is the problem of fatigue, consistency and incentive allowances. Because the requirements of various battery setups will usually differ, no universal scale of allowances can be used. There are, however, several aspects of the work which should be carefully weighed in determining these allowances. This may be considered a critical point in the computation of battery time studies because improperly set allowances here can completely wipe out all consistency between the standards set on several batteries. It is, of course, essential that every time study standard represent a given level of effort and skill. This is particularly important on machine batteries where the operator load often varies from as little as 60 per cent to as much as 125 per cent of normal.

Calculating Operator Load

The normal operator load, that is, the number of machines that should be assigned to an operator, can be determined by means of the formula already described. On a battery where there are fewer machines than the operator could normally handle, there will be a considerable amount of available operator time in each cycle.

This available operator idle time should be utilized by the operator for rest and relaxation on the job and for minor work rhythm interferences such as size adjustments on the equipment, extra handling for defective pieces and other delays which will often occur on such equipment. This available operator idle time eliminates the need for fatigue and consistency allowances that would otherwise be required. Thus, if it is not possible to utilize the operators' time on the job more fully, there should be little or no fatigue or consistency allowances made on this type of setup.

If, on the other hand, a battery is setup so that the operator is under full, or greater than full load, then it must be borne in mind that every interference in operator rhythm, or rate of performance, is immediately reflected in a loss of production. If the standard is to be successfully met on such a battery, it must include substantial allowances for consistency and for fatigue.

Where the standard is being used as a basis for incentive wages, the problem of incentive allowances should be given serious consideration. On a machine battery, when an operator is under partial or full load in terms of the number of machines that have been assigned, the rate of production is largely controlled by the machine time. Since the machine time is fixed, this means that the rate of production cannot be increased by the expenditure of additional effort by the operator. The only incentive possibilities available to the operator must come from spending more minutes per hour on the job than are called for in the standard.

Thus, the incentive levels which may be reached on this type of work are necessarily extremely limited and special inducements must be made to the employees if they are to be expected to turn in top performances. Unless an incentive value is placed upon the continuous effort which must be maintained in order to reach a high level of production, these jobs no longer become desirable from the employees' point of view and often develop into serious personnel problems.

The incentive allowance may be made by applying a rating factor of 100 per cent or more to the machine time as the situation requires. The result of this is to recompense the operator with more than 60 min. of pay for every 60 min. that the machines are in operation.

File Costs Halved by Reclamation

FILES customarily discarded when old or worn, may now be completely restored to cut file costs at least 50 per cent through a wartime method developed by the Sav-A-Tool Corp., 3582 Eastern Avenue, Cincinnati 26.

The Sav-A-Tool Method, is said, to be entirely new and has no similarity whatever to ordinary types of file cleaning or processing designed to prolong the usefulness of old files. All cutting edges on the worn file are carefully sharpened; all burrs are removed, actually resulting in a smoother cutting edge; all files are anti-rust treated and carefully inspected. The original temper is not affected.

In a series of tests carried on in conjunction with a number of large industrial users, it is reported that cutting life of the Sav-A-Tool files was found to average 80 to 90 per cent of the cutting life of the original file. Cutting edges were pronounced equally as sharp and efficient.

Files can be restored by the Sav-A-Tool method as many as three times, it is said. In most cases, restoration of files by Sav-A-Tool does not exceed an average cost of 12c each.

Surface Preparation For Spot Welding Aluminum

By S. G. THORNBURY
Technical Director, Turco Products, Inc.

. . . In cooperation with the Vultee Field plant of the Consolidated Vultee Aircraft Corp., a new type of etchant has been developed that removes soil and oxide film without attacking the subsurface metal and produces uniform surface contact resistance so desirable for consistent spot welds.

THE goal of research in the spot welding of aluminum alloys is the maintenance of spot weld strength and quality within consistent, specified limits. Stated somewhat differently, the goal is to provide the engineer with a reliable tool for the fabrication of stressed joints, a tool which may then be employed as a definite factor in aircraft or other design involving stressed aluminum sheet. It is only when this stage is reached that full advantage can be taken of the speed which spot welding promises in the manufacture of a larger proportion of primary aircraft structures.

There are several groups of variables which affect weld strength and consistency, weld penetration and symmetry. One group of variables is the condition of the metal itself, the condition of the metal after surface preparation and the condition of the metal surface after an interval has elapsed between surface treatment and welding. A second group of variables includes the characteristics of the welding machines employed, the accuracy of their calibration and the state of maintenance of this equipment. Line voltage and air pressure form another set of variables which must be controlled to insure consistent weld quality. The fit of the parts to be joined, and the skill and judgment of the operator also must be considered in the total welding picture.

Spot welding machines are complicated and hence are easily thrown out of adjustment. Indicated pressures are not always delivered pressures. Delivered amperages may vary considerably from those indicated on the dial. Spot welding machines, therefore, require regular checking and maintenance.

Skill and judgment of the operator should also be considered. A spot welding machine at a major aircraft plant was found to be behaving erratically during one shift, normally during another. The operator of the machine in question, with three years of experience in spot welding, was transferred to another machine; thereupon this machine too began to behave erratically. A study revealed that the operator whose work appeared to be associated with erratic performance was "pushing" the machine in an effort to break a production record. The abused machine responded with a succession of defective welds.

Consistent Resistance Value

It should therefore be emphasized that while the preparation of the aluminum surface for spot welding plays an important part, it is by no means the only factor to be considered in perfecting spot welding procedure. Neither can the importance of proper surface preparation be overlooked. The Aircraft Standards Welding Committee of the American Welding Society reports in *The Welding Journal*, August, 1942: "It appears that at least 75 per cent of the trouble experienced with surface spitting, weld spitting, irregularity in weld shape and the extent of electrode pickup can be attributed to improper surface preparation."

The primary function of surface treatment prior to aluminum spot welding is to produce a consistent resistance value to the flow of electrical current—preferably a low value. If the resistance fluctuates, even at low levels, the difficulties involved in obtaining consistent welds are multiplied. It may be stated that it is better to obtain a moderately high resistance uniformly than a fluctuating low resistance. The spot welding machines can be set for a known resistance value, even if it is moderately high, but sound welds cannot be produced consistently under conditions of fluctuating resistance even if such fluctuations take place within the lower resistance values.

The lower the electrode-to-sheet resistance, the lower the temperature generated at the interface, and consequently the better the utilization of the available energy at the sheet-to-sheet interface to form a sound ingot or weld button. As a corollary of the utilization of the heat to produce a button of the desired diameter and with the desired penetration, it can be expected that the extent of the heat affected zones will be held to a minimum. This is the key to sound, symmetrical welds of consistent, uniform microsection.

Conversely, the greater the surface resistance, the higher is the temperature at the surface and the greater the tendency to surface fusion, spitting, irregular weld contours and uneven weld penetration. Experimental data indicate a loss of shear strength as high as 15 per cent as a result of spitting—yet even such a soil as finger marks at the interface may create a tendency to spit.

The high surface resistance of untreated aluminum can be attributed basically to the presence of oxide which forms inevitably on aluminum

and its alloys exposed to air. It is not the thin, uniform oxide film formed on the metal at room temperature which is the source of the difficulty but the much heavier and unevenly distributed film deposited during heat treating, forming and drawing which results in high surface resistance.

Removing Oxide Film

The object of the surface treatment of aluminum prior to welding is the removal of all surface contaminants and the removal of the oxide film described above. Several methods are available to accomplish this result. The oxide film may be removed manually through the abrasive action of a wire brush, an abrasive powder or steel wool. The action of the abrasive must be slow, and it must be applied with even pressure to prevent the removal of metal or cladding along with the oxide film. The use of steel wool may result in the imbedding of minute shreds of steel in the aluminum, difficult to detect and difficult to remove by rinsing. These impurities at the sheet-to-sheet contact enter into the alloy composition during welding fusion, and may seriously affect the metallurgical quality of the alloy. The mechanical method will remove oxide film without tending to form a secondary high resistance film, but high cost, slow production rate and the necessity of close supervision of the operation make this method impractical except where spot welding is done on a limited scale only.

Measuring Surface Resistance

In order to arrive at an accurate appraisal of the comparative efficiency of various methods for preparing aluminum for spot welding, it was necessary to devise a means of measuring the surface contact resistance of the metal after treatment, and prior to welding. The process inspection laboratory of the Consolidated Vultee plant at Vultee Field utilizes for this purpose an apparatus consisting of a pair of standard ⅝ in. diameter Elkaloy A spot weld tips set in copper blocks which are installed in a specimen mounting press used as a source of pressure. Fig. 1. A Kelvin bridge is employed for measuring resistance. Current is supplied to dome tips by dry cells. Readings are calibrated in spring pounds from 200 to 2000 p.s.i.

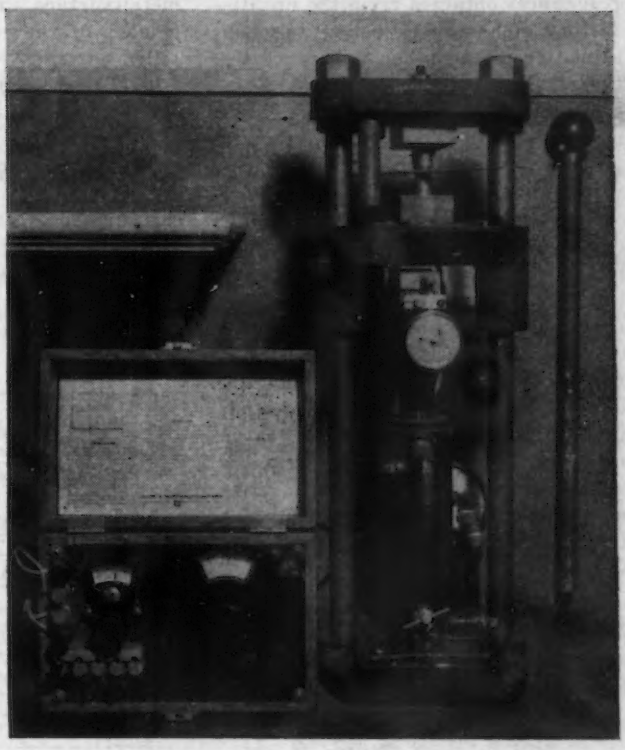
Absolute values were not given for the three methods of treatment which were graphed (Fig. 2) since variations in external circuit resistance and in electrode contours may have some bearing on the readings obtained, rendering it doubtful that the same readings would be secured in a comparable setup made up of a second set of these instruments. The absolute values have no merit as such, but the differences between values obtained on the same instrument, under identical conditions, are very significant indeed and are reproducible.

Typical curves are shown in Fig. 2 to illustrate the consistency of three methods of surface preparation for spot welding. The results produced by wire brushing and by Vulco Etch indicate satisfactory performance. At low electrode pressures, the slight advantage of Vulco Etch over wire brushing may be attributed to distortion of the surface caused by the latter method. The erratic performance of the unsatisfactory etchant may be explained by severe intercrystalline attack of the alloy, the deposition of undesirable salts or the galvano deposit of heavy metals. It is to be noted that while some of the

RIGHT

FIG. 1—Apparatus for measuring the surface contact resistance of aluminum alloys after treatment and prior to spot welding.

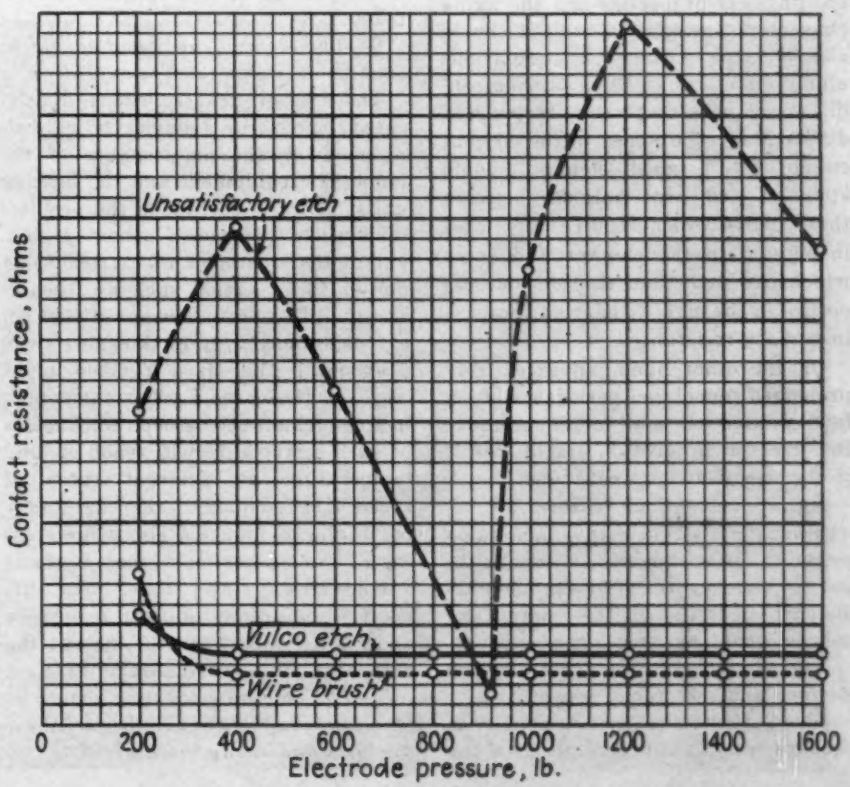
Photo courtesy Consolidated Vultee Aircraft Corp., Vultee Field.



o o o

BELOW

FIG. 2 — Contact resistance at various electrode pressures obtained with two types of etchants compared with that obtained by wire brushing.



resistances obtained from the unsatisfactory etch may be below those obtained from the other two processes, the results would nevertheless be unsatisfactory because the spotwelding machines cannot be adjusted for the best utilization of these resistances, which fluctuate with each spotweld.

Practically all aircraft spot welding departments have adopted a chemical method of oxide removal, commonly termed an "etch." The term "etch" is not well chosen since visible evidence of chemical attack on the metal surface is not only unnecessary but undesirable. The chemical method lends itself to volume production since large numbers of units can be treated simultaneously in immersion tanks and conveniently handled in suitable baskets transported by overhead conveyors.

Etching Requirements

A chemical etch should have the following characteristics:

1—*It should remove the oxide without attacking the metal.*

Hydrofluoric acid, for example, is energetic in attacking aluminum oxide film, but its action on the metal itself is just as violent and destructive.

2—*It should permit a long, non-critical immersion time.*

Chemicals such as sodium hydroxide remove aluminum oxide, but they also corrode the underlying aluminum even more rapidly, leaving a high resistance film or smut which may have detrimental effects on weld quality. Smut can introduce impurities into the weld button alloy which may alter the physical properties and the aging characteristics of the metal. It should also be borne in mind that the various aluminum alloys, in their varying conditions of heat treatment, respond at different rates of speed to the etchant employed. A good etchant should strike a temporal balance between those alloys which require only brief immersion in the etchant and those which can withstand considerable exposure to the etch without an increase in surface resistance.

On the other hand, an excessively prolonged immersion period would retard production and under pressure for greater production might result in the use of under-treated metal.

An etchant which covers all requirements within an immersion period of approximately 15 min., without a tendency to build up high resistance deposits in the short time metals would be most satisfactory.

3—*The etchant should have low surface and interfacial tension.*

These properties are desirable to produce rapid, uniform wetting of the metal surface, and to increase the efficiency of the etching of irregularly soiled parts.

4—*The etching compound should be capable of being easily and completely rinsed off.*

The presence of traces of the etching compound or reaction products on the surface or at the metal interface affects the quality of the weld to the same degree as the presence of other foreign matter.

5—*The etching compound should leave a minimum of undesirable residues.*

FIG. 3—Process flow diagram, showing the method of precleaning aluminum by the Vulco-Etch method.

Some etchants leave residues which are in themselves corrosive to the metal, a fact of particular significance if the etching of assemblies is undertaken.

6—*The etching compound should be capable of use at room temperature.*

The use of acid solutions at elevated temperatures inevitably involves problems in the maintenance of the immersion equipment and the heating units. More important is the problem involved in the use of a heated etchant in the treatment of extrusions of non-uniform section such as I-beams and the like. The structure of such an extrusion may vary in thickness from 0.060 in. at the edges to 0.500 in. or more at the corners. Obviously in a heated etchant the various thicknesses of such a structure will reach etching temperature at different rates of speed. The etching of the edges may begin almost immediately, while etching of the thicker metal may begin at a considerably later time. The difficulty of obtaining uniform resistance under such conditions throughout the area of a single structure is evident.

7—*The etching compound should be long lived, capable of simple periodical analysis and easily maintained.*

8—*The etching compound should be non-hazardous to equipment and personnel.*

Experimentation with solutions which corrode the surface of aluminum reveal that these compounds are selective in the manner in which they attack the surface. These etchants dissolve only certain of the constituents of the aluminum alloy, leaving a smut of insoluble constituents, or galvano deposited heavy metals. The result is a discolored, rough, irregularly pitted surface, which must be chemically bright dipped, then further rinsed and treated to render it acceptable.

Vulco-Etch Developed

Some years ago the laboratory of Turco Products undertook a cooperative research program with the Consolidated Vultee plant at Downey for at Vultee Field leading to the development of satisfactory etchants for aluminum in preparation for spot welding. An etchant was formulated, termed Vulco-Etch, which substantially meets all aluminum spot welding requirements. The process has been in continuous operation at the Consolidated Vultee plant at Downey for more than a year and during that period has produced consistently low resistance aluminum surfaces, day after day. It can be said that at this plant the cleaning factor, as one element of the many factors affecting weld quality, is under precise control.

Essentially, the principal of Vulco-Etch is that of an etch which will remove aluminum oxide while minimizing reaction with the underlying metal, thereby also minimizing the deposit of corrosion promoting elements which may result from such reaction.

Vulco-Etch is used at room temperature. It requires no thermal control. Exposure to its action is non-critical over a long immersion period. The recommended immersion time is 5-20 min., depending on the depth of the oxide coating, the gage of the metal and the nature of the alloy. A visibly etched appearance is unnecessary.

Because of controlled action of the compound, the possibility of over treatment, resulting in an increase of surface resistance, is materially reduced.

Vulco-Etch provides a bath adapted to simple chemical control and is conveniently adjusted by the addition of relatively non-hazardous, easily handled chemicals. The solution does not generate hazardous fumes, and there is no need for costly ventilating equipment. Since the material is used in simple, inexpensive wooden

tanks, installation costs are low and maintenance requirements practically non-existant.

Continuously Filtered

At the Consolidated-Vultee plant at Vultee Field, the etch solution is continuously filtered to remove contaminating matter. At intervals, sufficient fresh solution is added to compensate for dragout loss. Except for this necessary maintenance, the solution has not required replacement in more than a year of continuous operation. On the basis of present observations, it can be said that the solution has an indefinite lifetime. It has been reported that the solution, after six months used, performed better than when it was freshly prepared.

The new process leaves the metal in a bright condition. It does not produce smut or pitting. There is no need for a chemical bright dip or for further processing, other than rinsing and drying.

The process would appear to meet the requirements for an etch used on assemblies. It rinses readily. Even if a small proportion of the material should remain entrapped after rinsing, the remaining residues would be substantially harmless. To assure maximum exposure to etchant and rinse and proper drainage, 0.040 in. horseshoe pins or wedges between faying surfaces should be utilized.

The results of more than a year of testing in volume production appear to indicate that Vulco-Etch is capable of producing consistently low contact resistant surfaces at room temperature immersion.

Aluminum should be reasonably clean before it is placed in the etchant solution. While the solution will remove grease and oil, excessive amounts of these contaminants delay the deoxidizing function of the etch on the soiled areas.

Processing Sequence

The procedure of the Consolidated-Vultee Plant at Vultee Field may be typical of the entire process of preparing aluminum surfaces for spot welding. (See Figs. 3 and 4.) As parts are received in the spot welding department, they are freed of grease and soil in a hot, agitated solution of Turco Agiton, maintained at a temperature between 160 and 185 deg. F. This cleaner, which has the property of withstanding considerable agitation without foaming, removes identifying markings as well as grease and soil and produces a water-break free surface. This treatment is followed by a rinse in water maintained at 140 deg. F. After rinsing, the parts are immersed in the Vulco-Etch solution, which is followed by a cold water rinse, a warm water rinse at 140 deg. F. and warm air drying.

It should be noted that high temperature of the rinse water, while it tends to promote drying, also appears to increase the rate of oxidation of the metal, hence the surface resistance, and therefore should be avoided.

There has been considerable discussion as to the length of time which may elapse between the completion of the cleaning cycle and the spot welding of the metal, without a substantial increase in surface resistance taking place. Although the etchant accomplishes the removal of the aluminum oxide film, a new film inevitably begins to form as soon as the aluminum is exposed to air. This film, formed at room temperature, is thin and evenly distributed, and should not produce appreciable increase in resistance, even after one week's aging. However, other soils such as fingermarks, oil spatter and dust will in time accumulate on the metal and these will undoubtedly affect welding quality. It appears advisable, therefore, that welding be undertaken as soon as practical after cleaning.

The essence of uniform spot welding quality is control. The output of each machine should be checked periodically throughout the day. The machine setting should be established by the process control laboratory and the factor of personal judgment of the operator eliminated as far as possible. A series of settings and procedures must be arrived at wherein the inherent variability of the factors in the process will have the least effect. Among these factors, control over the cleaning and etching procedure is of major importance.

o o o

FIG. 4—In these tanks, installed at the Vultee Field plant of Consolidated Vultee Aircraft Corp., the aluminum surface is cleaned and freed of oxides prior to spot welding.

Relationship Of Brinell Hardness And Yield Stress

. . . The author has devised data whereby the yield stress of certain cast steels may be accurately checked by a non-destructive test, such as the Brinell hardness test. This is a paper read before the forty-first annual meeting of the Institute of British Foundrymen.

By T. W. RUFFLE

Metallurgist,
Lake & Elliot, Ltd., England

THE increasing importance of the yield stress as an acceptance test for steel castings has made it necessary to know if this can be accurately checked by a non-destructive method, such as the Brinell hardness test, and it is thought that the following information may be of interest to the practical foundryman.

The question assumed considerable importance in connection with certain highly stressed castings of approximately 100 lb. weight, of which large numbers were required. It was desired to test each casting, and the Brinell method was suggested. The following data show that care must be exercised in interpreting the results.

For other articles related to this subject see THE IRON AGE, *June 20, 1940, p. 32; and American Foundryman, June, 1944.*

The data have all been collected from test pieces and castings in routine production, heat treated in the normal way of output. The steel was of the 0.25 per cent carbon, 1.5 per cent manganese type made in the basic electric furnace. The test pieces were all of the clover-leaf[1] pattern, and were slit down their axial length with the oxy-acetylene torch before heat treatment (Fig. 1). All the test pieces and castings were given a uniform normalizing heat treatment in bogie bottom furnaces fired with pulverized coal. This treatment consisted of 4 hr. soak at 1688 deg. F., followed by air cooling on the bogie. The minimum properties required in the casting were 58,500 lb. per sq. in. yield point, 90,000 lb. per sq. in. ultimate stress, and 20 per cent elongation.

After the test bars had been pulled, Brinell readings were taken on a flat ground on the end remote from the head. All Brinell impressions dealt with in this investigation were made with a 3000 kg. load and a 10 mm. ball applied for 15 sec. The castings were all Brinelled in the same position after preparation of the surface with a small hand grinding wheel. Readings could be made on the test bars to 0.05 mm. and to 0.10 mm. on the castings. Three Brinell machines were used in the course of the investigation, but all were checked occasionally with a standard hardness block and found to be accurate.

[1] *"Design of Test Pieces for Carbon Steel Castings," by C. H. Kain and E. W. Dowson, Proc. I.B.F., Vol. XXXIII, 1939-40, p. 61.*

[2] *Greaves and Jones, J.I.S.I., 1926.*

A general relationship between B.H.N. and ultimate stress is widely recognized and used by engineers and metallurgists. It was therefore decided to examine this relationship as an opening to the present inquiry, and the following points were investigated in detail: (1) The B.H.N. and U.S. of separately cast test pieces; (2) the yield ratio of the test pieces; (3) the B.H.N. and yield stress of the test pieces; and (4) the agreement in B.H.N. between test pieces and castings.

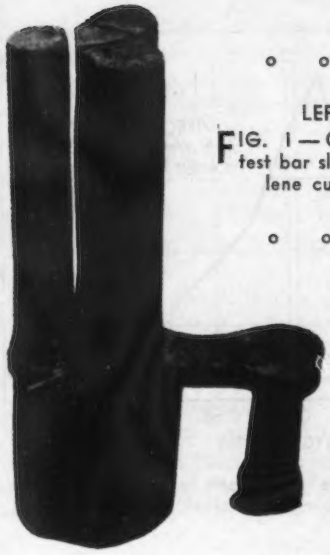
The factor relating the Brinell hardness and ultimate stress is estimated empirically, and is derived by dividing the ultimate stress by the hardness number, *i.e.*,

$$\frac{\text{U.S. (in tons per sq. in.)}}{\text{B.H.N.}} = \text{Factor}$$

Greaves and Jones[2] after statistical investigation of a considerable amount of data gave the following values for this factor:

Heat-treated alloy steel B.H.N. 250-400	0.210
Heat-treated alloy and carbon steel B.H.N. less than 250	0.215
Medium carbon steel as rolled, annealed or normalized	0.220
Mild steel as rolled, annealed or normalized	0.230

These factors are necessarily approximate, and more precise figures can only be established by considering data for a given steel in a given condition. The tables in general use for conversion of B.H.N. to U.S. are designed to deal as adequately as possible with all types of steel, and compromise on the factor employed. This

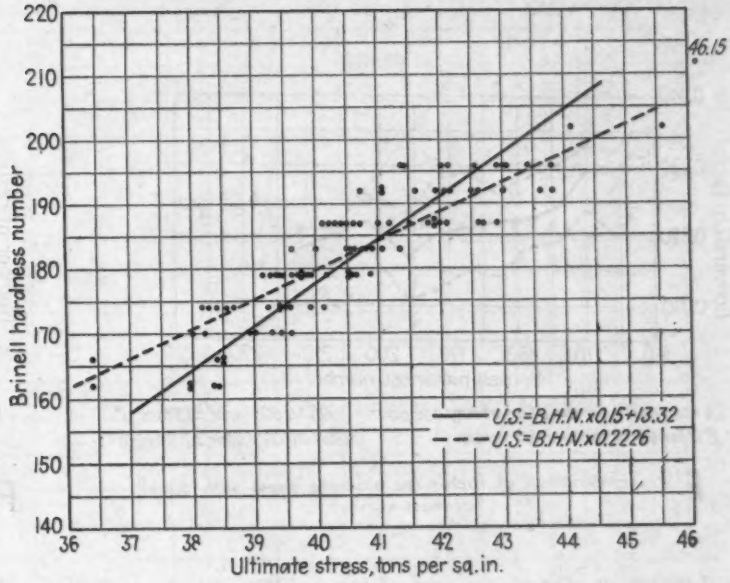


LEFT

FIG. 1 — Clover-leaf test bar slit by acetylene cutting.

RIGHT

FIG. 2—Correlation of Brinell hardness number and ultimate stress.



is not always done consistently, as may be seen in Table I, which compares the factors used and the equivalent ultimate stresses from three published tables. The author has used column "C" in this work. The greatest divergence arises in the range 143 to 207, in which range most of the work under consideration falls.

The experimental data from 100 consecutive heats are plotted in Fig. 2, to save large and cumbersome tables. Each result is represented by a dot at the appropriate point. A general summation of all the results gives an average conversion factor of 0.2226, *i.e.*,

$$U.S. = B.H.N. \times 0.2226.$$

Table II compares the average factor found by experiment with the average factor for the same section of the Brinell table in use. The difference is very small. The maximum and minimum factors are also compared in Table I, and it will be seen that more extreme results are derived from the experimental data. From an examination of Fig. 2, it is evident that there is a considerable variation in ultimate stress at any given B.H.N. Errors can arise from a number of factors affecting the accuracy of the ultimate stress figure, the accuracy of the Brinelling operation and reading and from variation from point to point in the material under test.

This spread of results is conveniently and quantitatively expressed as a ± variation from the average conversion factor. This is illustrated in Table III, which deals with the results from B.H.N. 187, and would be expressed 0.221 ± 0.008. Greaves and Jones[2] found under carefully controlled research conditions a variation amounting to ± 0.003; careful testing under workshop conditions on wrought steel gave results with a maximum variation of ± 0.011. To cover the most extreme results in the present case, limits of ± 0.012 are necessary. This indicates a possible error in estimating ultimate stress from the B.H.N. using the average factor of 0.2226, which is illustrated in Table IV, where results are worked out for a B.H.N. of 183 using average, maximum and minimum factors. It will be seen from these figures that the variation amounts to ± 2.2 tons per sq. in.

This variation is shown by a closer examination of the figures to be due to a progressive decrease in the conversion factor as the hardness increases. The change of factor found in the published conversion table is, therefore, borne out by these results, although the change does not necessarily coincide very well. The average factor at each hardness number is shown in Fig. 3, the downward trend being very marked. The extreme factors at each point are also plotted and show a variation of ± 0.008 if one or two very extreme results are ignored. It seems reasonable to take this as the margin necessary to cover the errors inherent in the methods employed. This margin of error amounts to ± 1.5 tons per sq. in. It is thus seen that the estimation of ultimate stress by using the average factor for all results allows a possible overall error amounting to ± 2.2 tons per sq. in. Referring again to Fig. 2, the broken line corresponds to

$$U.S. = B.H.N. \times 0.2226,$$

and it does not truly follow the trend of the plotted results. This is due to the variation in factor referred to above.

A full line is also shown on Fig. 2, which has been drawn to follow as nearly as possible the average ultimate stress at each hardness number. The formula for this line is found to be

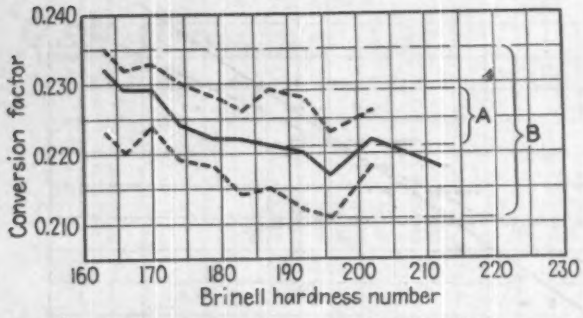
$$U.S. = (B.H.N. \times 0.15 + 13.32) \text{ tons per sq. in.}$$

This gives results within ± 1.5

TABLE I

Tensile Strength Related to Brinell Hardness from Published Sources

Diameter, MM.	Brinell Hardness Number			Conversion Factor			Equivalent Tensile Strength		
	A	B	C	A	B	C	A	B	C
3.0	415	415	418	0.2190	0.2210	0.2180	91.0	92.0	91.0
3.5	302	302	302	0.2150	0.2180	0.2180	65.0	66.0	66.0
3.8	255	255	255	0.2195	0.2195	0.2155	56.0	56.0	55.0
4.0	229	229	228	0.2185	0.2185	0.2190	50.0	50.0	50.0
4.2	207	207	207	0.2170	0.2170	0.2170	45.0	45.0	45.0
4.3	197	197	196	0.2205	0.2180	0.2195	43.5	43.0	43.0
4.4	187	187	187	0.2245	0.2195	0.2195	42.0	41.0	41.0
4.5	179	179	179	0.2235	0.2180	0.2205	40.0	39.0	39.5
4.6	170	170	170	0.2235	0.2180	0.2260	38.0	37.0	38.5
4.7	163	163	163	0.2240	0.2150	0.2300	36.5	35.0	37.5
4.8	156	156	156	0.2245	0.2180	0.2310	35.0	34.0	36.0
5.0	143	143	143	0.2240	0.2240	0.2306	32.0	32.0	33.0
5.4	121	121	121	0.2315	0.2315	0.2315	28.0	28.0	28.0



A=Normal max. variation at any one point =0.008± 0.008=appr. ±1.5 tons σ"
B=Max. variation over full range =±0.012 ±0.012=appr. ±2.2 tons σ"

FIG. 3—Variation of factor for ultimate stress with Brinell hardness number.

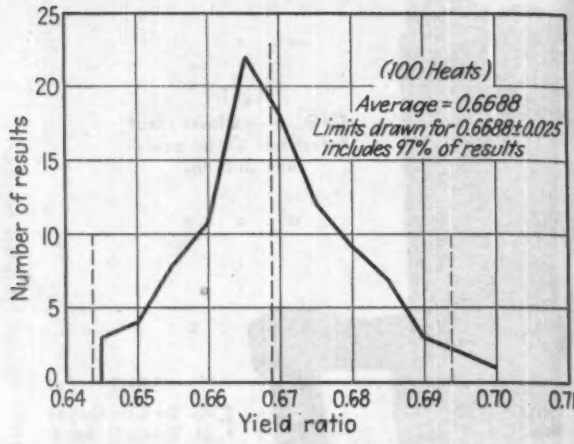


FIG. 4—Frequency curve: Yield ratio in normalized carbon-manganese steel.

tons per sq. in. for 95 per cent of the results. This is within the limits given above as due to naturally occurring errors.

Yield Ratio of Test Pieces

A method of investigation which originally suggested itself was to establish a relation between B.H.N. and ultimate stress and derive the yield point from the estimated ultimate stress by multiplication with the average yield ratio. The yield ratios for the 100 heats under consideration are shown plotted as a frequency curve in Fig. 4. The shape of the curve indicates a fairly normal distribution of this property. A more detailed investigation of the data showed a tendency for a lower yield ratio with a higher ultimate stress, but this was neither very marked nor very consistent.

The grand average for all results is 0.6688. The normal variation can be taken as ± 0.025, as this covers 97 per cent of the results. Estimating yield stress from an ultimate stress of 40 tons per sq. in. gives the results shown in Table IV. Therefore, with extreme normal variation of yield ratio, yield stress varies ± 1 ton per sq. in. for the same ultimate stress.

B.H.N. and Yield Stress

The results given by the indirect approach *via* the U.S. and the yield ratio using average factors is shown in Table VI. By assuming all variations to work adversely a difference of ± 2 tons per sq. in. in yield stress for the same B.H.N. is revealed. Such a range of error is not realized in practice, as may be seen in Fig. 5, in which yield stress is plotted against B.H.N. in the same way as was done for ultimate stress.

The average factor for all these results is found to be 0.1487, but, as before, the application of this factor in the normal formula, *i.e.*,

$$Y.S. = B.H.N. \times 0.1487$$

will leave a margin of error when applied over the range under consideration. This error amounts to ± 2 tons per sq. in. on the results under discussion. In Fig. 5 two lines are drawn —one corresponds to the factor of 0.1487 and the other is drawn as before to coincide as nearly as possible with the average yield at each hardness number. The formula to the latter line is found to be

$$Y.S. = B.H.N. \times 0.08 + 12.56.$$

Using this formula, 92 per cent of the results are within ± 1 ton per sq. in.

Agreement Between Test Pieces and Castings

As a preliminary to deciding upon a standard position for testing the castings, a number of castings were Brinelled at various points; in each case, all readings on the same casting agreed within 0.10 mm. The standard position adopted would, therefore, give representative results for the casting as a whole.

The castings in question were stacked on the trolley in a standardized very open formation. This allowed the maximum circulation both of hot gases in the furnace and cold air when cooling on the bogie. Castings on the outer corners, however, cooled appreciably more quickly than those in the center of the load. Duplicate test bars heat treated in different positions in the furnace had not shown any appreciable variation in properties. In order to confirm that the castings were equally consistent, several pairs of castings were taken, one of each being placed in the center of the load and the other on the cor-

TABLE II

Comparison of Factors Found Experimentally With Those of Published Column "C", Table I

	Published Table	Experimental Data
Average	0.2218	0.2226
Maximum	0.2300	0.2346
Minimum	0.2170	0.2106

TABLE III

Experimental Results at 187 B.H.N.

	Minimum	Average	Maximum
U. S. found = U.S.	40.1	41.4	42.9
= B.H.N.	0.215	0.221	0.229
Departure from average =	−0.006	+0.008	

Factor = 0.221 ± 0.008

TABLE IV

Showing Possibility of Error in Calculating Ult. Stress From B.H.N.

	Conversion Factor	B.H.N.	Calculated U.S., Tons Per Sq. In.
Maximum	0.2226+0.012=0.2346	183	42.9
Average	0.2226	183	40.7
Minimum	0.2226−0.012=0.2106	183	38.5

TABLE V

Effect of Variation in Yield Ratio

	Yield Ratio	Ultimate Stress, Tons Per Sq. In.	Calculated Yield Point, Tons Per Sq. In.
Minimum	0.6688−0.025=0.6438	40	25.75
Average	0.6688	40	26.75
Maximum	0.6688+0.025=0.6938	40	27.75

ner. The test bars corresponding with these arms were heat treated in the normal position on the load. The results are given in Table VII. The observed difference in rate of cooling does not appear to be sufficient to have any appreciable influence on the physical properties. (This is one of the attractive features of this type of steel.)

Comparison of the B.H.N.'s of the castings and test bars for 53 heats shows that, in general, the castings gave a slightly lower hardness than the test bars. The average difference for all results was 5 points Brinell. The extreme differences between castings and test bars were 5 points higher and 13 points lower. Comparison of B.H.N.'s for castings from the same heat shows an average difference of 5 points Brinell, the maximum difference ranging from 0 to 13 points. Test bars and castings from the same heat can, therefore, confidently be expected to give results falling well within ± 13 points Brinell, *i.e.*, a maximum range of 26 points.

(26 points B.H.N. = 0.30 mm. diameter = approximately 5 tons U.S. or 3.5 tons Y.P.)

Conclusions

(1) The yield point and ultimate stress of carbon-manganese steel, heat treated and tested as described herein, can be estimated by the formulas:

Y.P. = B.H.N. × 0.08 + 12.56

U.S. = B.H.N. × 0.15 + 13.32

with an accuracy of ± 1 ton per sq. in. for the former and ± 1.5 tons per sq. in. for the latter.

(2) In order to guarantee a minimum yield point of 26 tons per sq. in., the minimum B.H.N. must be

$(26 + 1) = x \times 0.08 + 12.56 = 180$

This corresponds to a minimum ultimate stress of 40.3 ± 1.5 tons per sq. in.

(3) In the same way, if it be necessary to establish a maximum ultimate stress, allowance should be made for the normal variation of ± 1.5 tons per sq. in.

(4) It should be emphasized that these results will apply strictly only to the type of steel now under consideration in the condition described.

For all other types of steel and conditions of heat treatment, the fullest information as to physical properties can only be derived from the B.H.N. by the analysis of accumulated data.

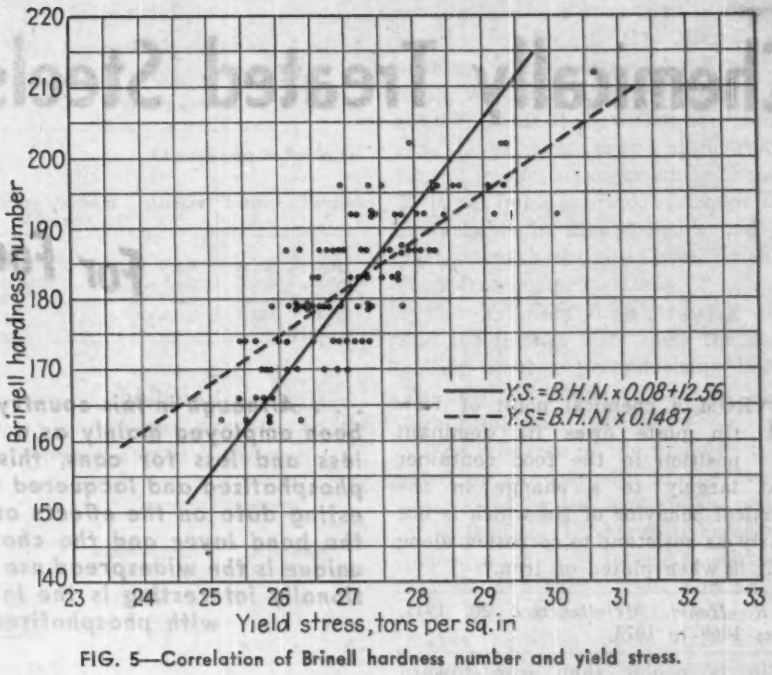


FIG. 5—Correlation of Brinell hardness number and yield stress.

TABLE VI

Brinell Hardness Number and Yield Stress of the Test Pieces

B.H.N. × 183

- Max. conversion factor (0.2346) = 42.9 tons per sq. in. U. S. × max. yield ratio (0.6938) = 29.75 tons per sq. in.
- Av. conversion factor (0.2226) = 40.7 tons per sq. in. U.S. × av. yield ratio (0.6688) = 27.22 tons per sq. in.
- Min. conversion factor (0.2106) = 38.5 tons per sq. in. U.S. × min. yield ratio (0.6438) = 25.39 tons per sq. in.

TABLE VII

Influence of Position of Casting in Load on Mechanical Properties

Heat Number	C, Per Cent	Mn, Per Cent	Yield Point, Tons Per Sq. In.	Ultimate Stress, Tons Per Sq. In.	Yield Ratio	Per Cent Elongation	B.H.N. of Test Bar	Casting B.H.N., Corner of Load	Casting B.H.N., Center of Load
C.11690	0.22	1.50	26.00	38.25	0.680	20	170	170	174
C.11693	0.24	1.51	26.85	39.55	0.680	25	174	174	170
C.11696	0.25	1.52	27.80	40.60	0.685	24	179	183	179
C.11697	0.22	1.51	25.90	38.50	0.675	26	168	174	170
C.11701	0.23	1.52	27.30	41.05	0.665	21	183	179	179

Soap Aids Wire Drawing

WIDER use of soap as a lubricant in wire drawing and in the deep drawing of metal products is evidenced by several recent patents. In a procedure outlined by S. Spring in U. S. Patent 2,329,731, the metal to be drawn or formed by pressure is first immersed in an aqueous soap solution (0.025 to 0.5 per cent) for at least 1 hr. prior to forming.

F. C. Elder (Pat. 2,349,708) describes a further modification. He applies to the wire a lubricant consisting essentially of sulphur and wire drawing soap. These are used in the proportions of from 2 to 4 parts by weight of sulphur and from 1 to 3 parts by weight of the soap.

Chemically Treated Steels

For Food Cans . . .

Translated By
C. M. COSMAN

. . . Although in this country phosphate and lacquer coatings have been employed mainly as a war measure and are now being used less and less for cans, this article on German experience with phosphatized and lacquered steel sheets in can making gives interesting data on the effects of primary treatments, the influence of the bond layer and the choice of suitable lacquers. Particularly unique is the widespread use of welded cans in Germany; and additionally interesting is the longer life obtained with certain foods with phosphatized cans than with tin cans.

FROM a chemical point of view tin plate owes its dominant position in the food container field largely to a change in the chemical behavior of tin which is not nearly as resistant to corrosion alone as it is when plated on iron.*

* *R. Hanel, Metallwirtsch* 20, 1941, pages 1069 to 1073.

Tin is nobler than iron toward mild foods, such as meat or milk. But in the presence of fruit acids it enters the solution itself and protects the iron cathodically (vegetables and fruits frequently act anodically toward iron). This behavior permits the use of tin plate in which freedom from pores is of no importance. The comparative simplicity of tin plating, its easy workability and the high strength of the thin steel sheet are further advantages, and its cheapness makes possible the use of tin plate for the packing or canning even of inexpensive materials, Ludwig Schuster writes in *Stahl und Eisen*, Aug. 12, 1942, pages 685 to 694.

Tin plate is, however, by no means a perfect and irreplaceable material for canning. Its stability against a number of fillings is only limited and sometimes cans must be lacquered for increased corrosion resistance. Albumin bearing foods containing sulphur compounds often produce a black discoloration, which is occasionally transmitted to the contents of the can. However, this discoloration is not harmful, and a blue discoloration caused by similar conditions even offers an additional protection, but a metal taste can almost always be detected. Also the surface tin plate does not offer much protection against atmospheric corrosion. However, the greatest drawback is the scarcity of highly strategic tin.

It seemed, therefore, desirable to replace tin plate in food canning. Lacquered black plate was first investigated owing to experiences in Germany in the first World War and in the lacquering of tin plate. The conditions for success are:

(1) Adequate chemical stability against the contents,
(2) Adequate bond to the black plate.
(3) Freedom from pores, since the steel itself has to be protected.

It was found impossible to meet these conditions by painting or spraying the sheets in the rolling mills, as the lacquer was always damaged at one point or other. For that reason the manufacture of phosphatized and lacquered black sheet cans was investigated. They were to be formed first and then to be processed, Bonderized and lacquered. The phosphate layer (bond layer) binds the lacquer to the base metal and increases the general corrosion resistance of lacquered cans. (Vierjahresplan 4, 1940, pages 279 to 280.)

Influence of the Bond Layer

The bond layer, consisting of tertiary zinc phosphate with a certain amount of secondary and tertiary ferro-phosphate, appears as a skin of crystals similar to the iron surface (L. Schuster, Stahl und Eisen, 60, 1940, pages 758 to 790) which causes a roughening and a considerable increase of the surface area. The layer itself is non-metallic and contains, according to W. Machu (Korrosion und Metallsch, 17, 1941, pages 157 to 160) about 0.30 to 0.50 per cent pores as do all phosphate layers. It can retain organic materials such as oils or lacquers very firmly, offers an excellent grip to the lacquer and is therefore a good base. Although not corrosion resistant by itself, the non-metallic nature of the binder improves the corrosion resistance of the lacquer considerably and prevents or reduces corrosive action on the can itself when the lacquer is damaged.

The modern phosphatizing process produces even phosphate layers and, depending on the operation, allows adjustments for thickness and grain size. A thin, finely crystalline phosphate layer is obviously better suited than a heavy cover. Since the crystalline phosphate layer has a low degree of plasticity, considerably lower than the metal beneath, a heavy bond layer is also more difficult to cover and may spoil the appearance of the can. To produce bonded and lacquered cans equal to the mechanical requirements, two bonding processes were tried, one with a phosphate layer of about 0.0001 in. ("Bonder 5 process") and a "Bonder 2 process" with a heavier zinc phosphate layer of 0.0004 in. thickness.

For comparing the influence of different primary treatments, cold rolled strip of 0.01 in. thickness was:

(1) Not pre-treated
(2) Surface sand-blasted
(3) Bonded with approximately 0.0001 in. phosphate layer ("Bonder 5")
(4) Bonded with approximately 0.0004 in. phosphate layer ("Bonder 2")

For sand blasting, quartz sand was used and care was taken that a surface roughness was obtained equal to the "Bonder 5" surface. The sheets were coated with a number of lacquers, and the lacquering technique, as well as all other conditions, was made to approximate practical conditions, and standardized to obtain strictly comparable values (Table I). The synthetic lacquers A to C are

extensively applied in black sheet lacquering.

Cans are exposed to a certain degree of deformation in use. The knowledge of their behavior under these stresses is of great importance, and was tested with the H. Niesen and W. Roehrs apparatus (Farben-Ztg. 1940, pages 331 to 352 and 569 to 570. French Patent 705,690, Feb. 8, 1930). Here the alternating current which flows under 10 volts between the lacquered sheet and an electrode in a cell with a liquid conductor is measured as a function of the deep drawing of the lacquered sheet. As long as the lacquer layer remains intact no current flows. But with increasing deformation of the sheet causing cracks in the lacquer, the current increases proportionately. Results of this test are shown in Figs. 1 to 3. Evident at once are the differences between the various lacquers.

The deformability of the lacquer layers on the thin bond is better in one case (lacquer C) while the deformability of lacquers A and B is not much worse on the thin bond than on the clean untreated surface. "Bonder 2" gives bad deformation values. The behavior of the sand blasted sheets is remarkable: The lacquer layer develops cracks owing to the excellent surface grip, but individual particles of the cracked lacquer layer remain on the sheet. Lacquer C did not produce a dense film on the sand blasted surface owing to its great porosity, even when 0.026 to 0.033 oz. of dried film were applied per sq. ft. As distinct from the remarks of von Fuerer-Arndts (Aluminum Berl., 22, 1941, pages 63 to 67) that brittleness in the bond layer leads to low deformability in Bonderized and lacquered containers, these experiments have shown, in agreement with practice, that thoroughly satisfactory deformability exists if suitable lacquers are used.

H. Niesen (Farben-Ztg., 1941, pages 478 to 480 and 496 to 497) suggested that lacquered container sheets should be treated for impact resistance by an impact testing process. The treated sheets are deformed by the impact of a hammer of given weight dropping from a given height. Currents are measured in a similar manner as in the deep drawing test, before and after impact. The impact impression is comparatively deep. (This test poses the question whether it approximates practical service conditions for containers. Undoubtedly, some containers are indented over a fairly large area owing to the low strength of the sheet, but the sudden impact stresses suggested by this test hardly occur in practice. Observations on numerous, comparatively heavily stressed, cans have shown that injuries resulting from a blow always act over a larger area than is affected by the impact of the Niesen apparatus. This impact test nevertheless gives useful relative values. Results in Table II show that the "Bonder 5" layer causes only a slight reduction in impact strength while "Bonder 2" is not quite as good. Lacquer B is remarkable in that it has a bad impact strength but quite good Erichsen deep drawing properties.

The Erichsen deep drawing tests and the impact tests show the desirability of thin phosphatizing layers. The use of "Bonder 5" seems, therefore, completely justified.

The influence of the primary treatment on the porosity of the lacquer was tested by the well-known method of V. Duffek. In this test sheets were placed anodically to a d.c. source of 8 volts and the current flowing was read after 3 sec. This process also makes the pores visible, since a white color appears wherever metallic iron is free. In order to show up more clearly the differences between the various treatments, a thin lacquer layer was chosen. As Table III shows, the porosity of the lacquer coating is reduced considerably by Bonderizing. Again lacquer C has the greatest number of pores. Also the difficulty of obtaining complete protection for the merely sand-blasted surface is shown up by these values. Heavy phosphate layers do not allow smooth lacquering of the sheets, but their corrosion resistance is not necessarily bad. Some zinc phosphate crystals probably crag out over the lacquer film, but, they do not cause any corrosion owing to their nonmetallic nature. The remarkable reduction in the porosity of lacquer layers on a phosphatized surface is very important and explains the excellent behavior of bonderized and lacquered container sheets, for the first corrosion attack will occur through the pores.

TABLE I

Weight of Lacquer Layers in the Various Sheets after Different Primary Treatment

Primary Treatment of Sheets	Lacquer Layer, Oz. Per Sq. Ft.		
	Lacquer A	Lacquer B	Lacquer C
Untreated	0.028	0.030	0.027
Sand-blasted	0.032	0.033	0.029
Bonder 2	0.027	0.032	0.029
Bonder 5	0.031	0.031	0.028

TABLE II

Strength of Various Lacquers in the Impact Test of H. Nisen

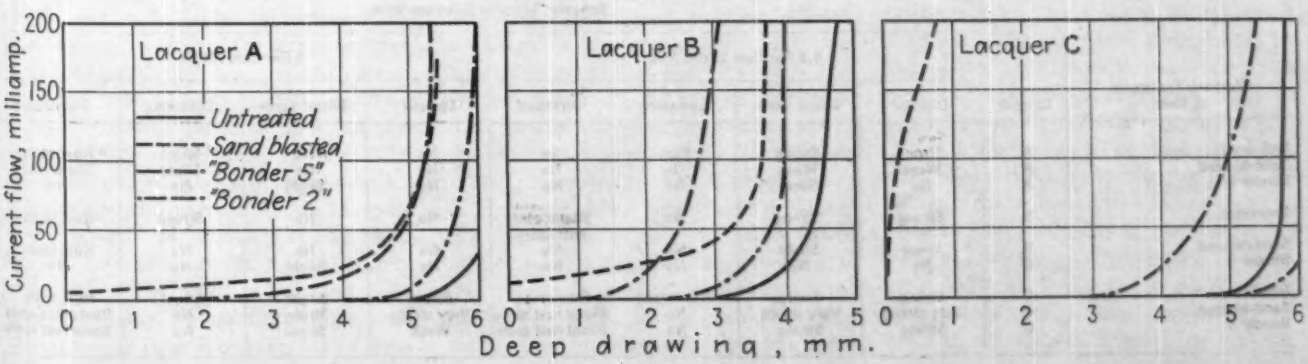
Primary Treatment of Sheets	Current in Milliamperes					
	Before Impact			After Impact		
	Lacquer			Lacquer		
	A	B	C	A	B	C
Untreated	7	0	5	7	125	5
Sand-blasted	70	45	450	200	385	700
Bonder 2	2	0	8	64	670	200
Bonder 5	2	0	4	20	450	8

o o o

Corrosion Protection

The general corrosion resistance of sheets protected by the same lacquer

FIGS. 1 to 3—Erichsen deep drawing test for various lacquers as a function of current flow.



but with varying primary treatment was investigated by exposing them to a salt spray (water containing 3 per cent NaCl). Some sheets were scraped down to the metal to evaluate the effect of the primary treatment. It was found that Bonderized sheets yield by far the best results while the bright untreated and the sand-blasted sheets show considerable corrosion. Even after 192 hr. of testing, the superiority of the bonded sheets is still evident.

Since the foods in the closed cans are cooked under pressure at 120 deg. C. (248 deg. F.) the behavior of cans under these conditions is very important. Most foods are either salty or acid. Different cans painted with lacquers A, B and C were therefore tested against lactic acid and against sodium chloride solutions and the dissolved iron was chemically determined (Table IV). The Bonderized cans always performed best, although considerable differences were observed among the various lacquers. Results of the salt solution test also showed considerable differences in the appearance of the cans with the bonded can perfect; the sand-blasted can showing incipient corrosion at the bottom and at the lid, and the lacquer partially peeled off the untreated bright sheet can. In Table V the behavior of the cans has been summarized again.

When the test period was increased, the influence of the primary treatment on the lacquer showed up even more clearly. The results of these tests are summarized in Table VI. In both tests the Bonderized sheets were superior, and the sand-blasted sheets performed better than untreated sheets, but did not approach the performance of the Bonderized sheets. Owing to the excellent grip offered by the roughened, sand-blasted surface, the lacquer covers peeled off only partially. The untreated metallic surface performed very badly.

TABLE III

Results of Porosity Test (Duffek) after Varying Primary Treatments

Primary Treatment of Sheets	Lacquer Weight, Grains Per Sq. Ft.			Current in Milliamperes*		
	Lacquer			Lacquer		
	A	B	C	A	B	C
Untreated	7.36	6.56	6.05	60	30	140
Sand-blasted	7.55	7.25	6.74	500	480	780
Bonder 2	6.64	7.18	6.57	2.5	7.5	10
Bonder 5	7.42	6.84	6.15	10	17.5	20

* Current over 112.5 sq. cm. of test surface at 8 volts.

TABLE IV

Solubility of Iron in Cooking Test With Differently Treated and Lacquered Cans

Primary Treatment of Sheets	Iron (Mg.) Gone into Solution With*					
	0.5 Per Cent Lactic Acid			3 Per Cent Na Cl		
	Lacquer			Lacquer		
	A	B	C	A	B	C
Untreated	36	22	220	12	10	11
Sand-blasted	25	18	220	9.3	7.6	13
Bonder 5	11	14	74	7.1	6.5	8.7

* Cooking at (approximately) No. 2 Can ½ hr. at 248 deg. F.

Corrosion tests show that the phosphate layer fulfills two functions:

(1) It provides a connection between the metal surface and the lacquer cover, and promotes the gripping of the lacquer on the metal surface.

(2) It increases the corrosion protection of the base metal, being itself non-metallic.

Sand-blasting also improves the gripping action of the lacquer cover. However, it cannot guarantee actual corrosion protection. This fact is important, since it is frequently thought that the phosphatizing process consists only in the roughening of the metal surface for a better gripping action on the lacquer cover.

Both the physical and the corrosion-chemical tests show the great importance of the choice of suitable lacquers. (H. Weise, Korrosion und Metallsch, 17, 1941, pages 363 to 365). At present oven drying plastic lacquers are being used exclusively and their corrosion resistance is much superior to the materials formerly used. The drying temperatures are usually above 356 deg. F. The most important representatives of the container lacquers today come from the group of phenol resins and alkyd resins. Also, mixtures of various plastic resins are being used, phenolic and phthalic acid resins, for example. All these lacquers have good water resistance and cooking stability. The cooking stability is particularly important because of the possible influence on the taste. Of course differences arise between the various types of lacquer. But the advances made here are also most promising. The tests reported on, while showing considerable differences in the behavior of the lacquers, all point to the improved corrosion resistance due to the bond layer.

Manufacture of Phosphatized Cans

In Germany the bonded and lacquered container has been in production for a number of years. Soldered cans have been replaced by welded cans. Automatic welding machines were developed to correspond in performance to automatic soldering machines which are of the electric roll welding type and are safe and trouble-free in performance.

Cold rolled strip with its excellent surface properties is well suited for phosphatizing. The combination of cold rolled strip and welding effects a considerable saving of sheet; approximately 363 lb. of steel are saved per 100,000 cans.

In early manufacture, the can body was first cut in the usual manner for untinned, unlacquered sheet or strip. Then the body was formed

TABLE V

Results of ½ hr. Cooking Test With Cans in Lactic Acid and Salt Solution at 248 Deg. F.

Primary Treatment of Cans	Lacquer	Behavior Towards Solutions With							
		0.5 Per Cent Lactic Acid				3 Per Cent Na Cl			
		Discolor	Blister Form	Loosening	Corrosion	Discolor	Blister Form	Loosening	Corrosion
Untreated	A	Strong	Strong	Part.	No	No	No	Slight	Rust spots
Sand-blasted	A	Weak	Weak	No	No	No	No	Slight	Slight rust
Bonder 5	A	No	Slight	No	No	No	Slight	No	No
Untreated	B	Strong	Strong	No	80 per cent rust spots	No	No	Strong	Rust spots
Sand-blasted	B	Weak	Slight	No	No	No	No	No	Rust spots
Bonder 5	B	No	No	No	No	No	Slight	No	No
Untreated	C	Strong	Strong	Very strong	Rust areas	Strong	Slight	Slight	Rust spots
Sand-blasted	C	Very strong	Very strong	No	Many rust spots	Very strong	Strong	No	Rust areas spots
Bonder 5	C	Strong	Strong	No	Slight rust spots	Weak	Slight	No	Some rust spots

TABLE VI

Results of 1-Hr. Cooking Test With Sheets in Lactic Acid and Salt Solution at 248 Deg. F.

Primary Treatment of Sheets	Lacquer	Behavior Towards Solutions With							
		0.5 Per Cent Lactic Acid				3 Per Cent Na Cl			
		Discolor	Blister Form	Loosening	Corrosion	Discolor	Blister Form	Loosening	Corrosion
Untreated	A			Complete		No	No	Strong	Rust spots
Untreated, scratched	A			Complete		No	No	Strong	Rust spots
Sand-blasted	A	Strong	No	No	Rust spots	Very strong	Very strong	Weak	Weak rust
Sand-blasted, scratched	A	Strong	No	No	Rust spots	Very strong	Very strong	Weak	Weak rust
Bonder 5	A	Slight	No	No	No	Slight	Strong	No	Some rust spots
Bonder 5, scratched	A	Slight	No	No	No	Slight	Strong	No	Some rust spots
Untreated	B			Complete		Weak	No	Weak	No
Untreated, scratched	B			Complete		Weak	No	Strong	
Sand-blasted	B	Strong	No	No	No	Strong	No	No	Rust spots
Sand-blasted, scratched	B	Strong	No	No	No	Strong	No	No	Many rust spots
Bonder 5	B	No	No	No	No	No	No	No	No
Bonder 5, scratched	B	No	No	No	No	No	No	No	No
Untreated	C			Complete				Complete	
Untreated, scratched	C			Complete				Complete	
Sand-blasted	C			Complete				Complete	Strong rust
Sand blasted, scratched	C			Complete				Complete	Strong rust
Bonder 5	C	Strong	No	Very strong		Weak	No	No	Rust spots
Bonder 5, scratched	C	Strong	No	Very strong		Weak	No	No	Rust spots

by electric resistance welding and finally, after adjusting the seal, the bottom was crimped.

The first phosphatizing and lacquering plants were still separate, that is phosphatizing with the necessary before and after treatments, and lacquering were carried out in separate plants. These experiences later lead to industrial scale establishments in which the two steps are combined. But the separation of the production steps allows a greater freedom in the lacquering, and a return to the old idea in an improved form is possible. In a completely automatic phosphatizing and lacquering plant, the finished cans are brought by an automatic conveyer to the filling station and placed in trays. The cans then go through the wet treatment steps: Degreasing, rinsing, phosphatizing, rinsing and drying. A special channel permits checking the cans for phosphate layer and for thorough drying. Only then the actual lacquering step follows, and drying and burning of the lacquer surface. After passing through a protracted cooling area, the cans are removed.

Direction and supervision of the whole plant and the adjustment of the necessary working temperatures takes place from one point. Each tray can hold 24 cans or 240 lids. The total number of trays is 630 and the length of the conveyer is 787 ft. The total weight of the moving conveyer with trays and cans is about 11 tons, total length is about 148 ft. and height is about 20 ft. The hourly capacity of the plant is between 5000 and 6000 cans, depending on the rate of travel of the conveyer. For reasons of heat economy it is advisable to operate the plant in two to three daily shifts. This has actually been done in large scale plants over a period of 2 years. The manufacture of Bonderized cans is only economical if the production assumes a large volume and the performance of the Bonderizing method is, therefore, most important.

A few fundamental considerations of the phosphatizing process follow. This process is built up on the basis of zinc phosphate and zinc nitrate solutions. In the bonding bath the following chemical reactions probably occur:

(1) $Fe + 2H_3PO_4 = Fe(H_2PO_4)_2 + H_2$

(2) $3\ Zn(H_2PO_4)_2 = Zn_3(PO_4)_2 + 4\ H_3PO_4$

(3) $2\ HNO_3 + 5\ H_2 = N_2 + 6\ H_2O$

(4) $Fe^{II} \overrightarrow{O} Fe^{III}$

The bonderizing process consists fundamentally of the following:

(1) A pickling process which brings iron into solution.

(2) The ferrous iron in the solution and especially along the face between the metal and solution effects a neutralization of the phosphate solution (decrease of the hydrogen ion concentration) and thereby causes a shift in the equilibrium which favors the formation of insoluble phosphate.

The increase in the concentration of ferrous ions particularly along the interface effects a rapid shift in the pH values so that in general the precipitation of insoluble phosphates is limited to the phase between metal and liquid, whereby insoluble phosphates (tertiary zinc phosphate) are precipitated on the iron surface.

(3) By the addition of nitrate or the nitric acid in the bath a depolarization of the hydrogen on the metal surface takes place, whereby the time needed for the phosphatizing process is reduced from 30 to 60 min. to a few minutes. The nitrates and the products of their reduction effect also the oxidation of the ferrous ion in the solution which precipitates an insoluble ferric phosphate as bath mud, whereby the stability of the phosphatizing process is established.

(4) For that reason the zinc content of the bath can be kept independent from the area of iron surface treated, and phosphate layers are formed which, also independent of the surface treated, show a constant composition combined with constant physical properties.

Fig. 4 shows the composition of the layer as a function of the steel surface treated, using solutions with or without nitrates. It is seen that the nitrates-free solution always yield iron-rich layers, whereas the nitrate-bearing solutions furnish layers of constant composition independently of the amount of material treated. The ferrous phosphate in the phosphate layers oxidizes very easily, therefore, such layers tend to corrode rapidly. With increasing use of the bath corrosion protection of the phosphate layers decreases and in spite of make-up additions, a frequent renewal of the bath is necessary.

For a stable phosphatizing process only such cations can be used which are consumed in the formation of layers. If sodium nitrate or sodium nitrite would be used instead of zinc

nitrate, then with increased use of the bath an enrichment of alkalis takes place and the baths would have to be discarded from time to time. Similar considerations are valid for anions nitrates producting nitrogen and water. But if, for example, a chlorate were used as oxidizing agent, chlorides would be formed, necessitating the periodic renewal of the solution. The phosphatizing process on the basis of zinc-phosphate or zinc-nitrate satisfies the conditions of complete stability. Four to six sq. ft. of surface are treated per gallon of solution per day, and the plants operate in two and a half to three shifts or 20 to 24 hr. per day to make full use of the machinery. Solutions without the accelerating agent could not be used for reasons of economy.

The solutions as described have been in operation for a number of years. They are only made up to replace losses and the mud is removed from time to time in a settling tank. In a phosphatizing process the quality of the product is a condition which must be accompanied by operational facility and stability of the plant.

Practical Performance

The practical performance of the phosphatized can with the available lacquers has been tested by a number of established institutions. Thus in one research establishment a number of foods were held at a temperature of 98.6 deg. F. for one year and complete stability toward meat and vegetables was shown. When filled with spinach, asparagus and meat in oil, these cans were superior to tin cans. But their stability towards fruits was not equal to that of tin cans. The same results were obtained in practice. Toward meat and vegetables the can is fully reliable. In spite of an improvement in the quality of the cans in the course of time, they are stable only to a limited extent against strongly corrosive fillings such as a number of fruits.

Further development of the phosphatized cans depends primarily on the lacquer. The usefulness of the phosphatized can will increase in the same measure in which the stability of the lacquer towards stronger acids increases. Recently considerable advances have been made so that the modern phosphatized cans are considerably superior in quality to earlier ones. The production of fully welded cans, in which also the bottom is welded, would constitute a great advance since the corrosion which frequently occurs along the bottom crimp could be obviated by a fully welded can. It must not be forgotten that welding of cans will also offer a considerable saving in steel.

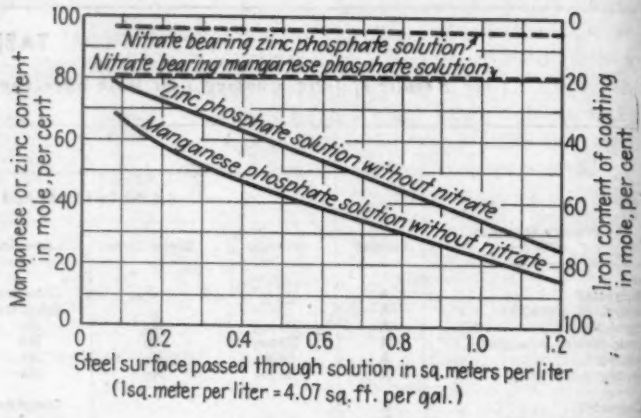


FIG. 4 — Relationship between the compositions of the layers on phosphatized sheets and the surface area passed through the solution.

Vacuum Test Pit for Impellers

THE large vacuum test pit in the research laboratory of the Buffalo Forge Co., Buffalo, is a good example of what is being done to study stresses and improve the quality of high speed rotating machinery. The shell, which is set in concrete below floor level, is 6 ft. in diameter by 4 ft. deep. It is made of heavy construction to withstand absolute vacuum. While it was designed along the lines of the General Electric device for testing turbosupercharger impellers and is capable of operating at 60,000 r.p.m., it will generally accommodate larger fans at lower speeds.

WHAT is believed to be the first installation of its kind made by a fan manufacturer, this vacuum test pit enables fan rotors to be tested at extremely high tip speeds with little power. Operator is shown at control panel about to start operation of vacuum pump.

The impeller to be tested is hung by a slender shaft from a small air turbine mounted on the cover. A vacuum pump exhausts the air from the drum so that it takes practically no power to spin the fan. The pressure within the drum may reach as low as 200 microns of vacuum (0.00787 in. of mercury absolute as compared to standard atmospheric pressure of 29.92 in. of mercury). Under these conditions the power to drive the fan (exclusive of the turbine friction) is about 1/4000 of the power under normal conditions. Thus, a fan that would require 1000 hp. to drive normally can be operated in a vacuum of 200 microns by ¼ air hp. In order to keep the speed indicating device from absorbing power at the higher speeds, an electronic frequency meter is used.

Several purposes are served by a test pit of this type. To insure the

(CONTINUED ON PAGE 136)

Welding at The Battlefronts

Official Signal Corps photos by courtesy of Lincoln Electric Co.

ABOVE
. . . Modifying a machine gun at a service station in Australia by welding on a shield.

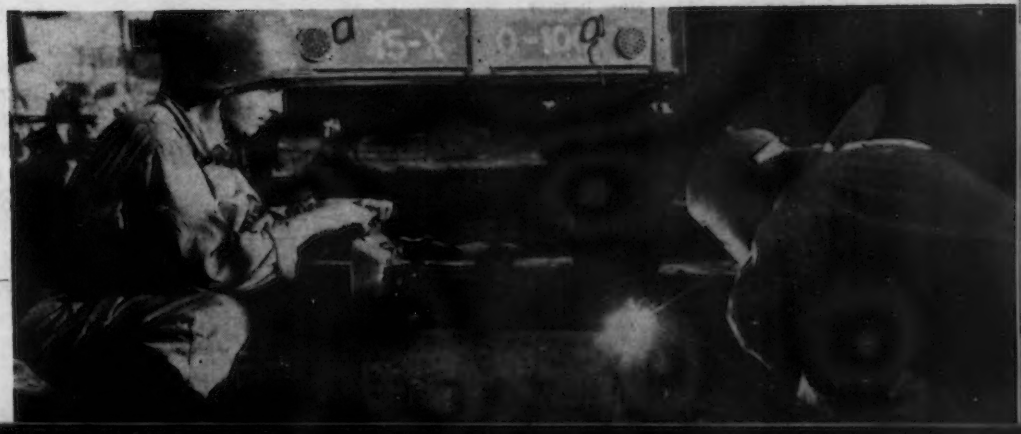
o o o

LEFT
. . . This tank track roller will again become an important cog in a big machine when a shell nicked flange is rebuilt by arc welding.

o o o

LEFT
. . . Somewhere in New Caledonia, G. I. Joe welds a tractor coupler. Tool truck is in the background under the palms.

o o o



RIGHT
. . . In Italy a field range burner is welded to an auxiliary tank. The job is being done in the shop of an ordnance company of the 45th Division at Vairano.

Krause Reciprocating Mill

Used in Brass Rolling

. . . This unique rolling mill with a reciprocating roll assembly is being successfully employed for heavy reductions on wide brass strip. Indications are that it also may find application in the reduction of steel strip requiring particular physical characteristics.

THE first commercial installations of the Krause cold reducing mill at the plants of the C. G. Hussey Co., Pittsburgh, and the Michigan division of the Revere Copper & Brass Co., Detroit, indicate possibilities for application of this method of rolling to a range of both hot and cold rolling operations. While these initial installations are being used for rolling copper and brass, working tests of the mills indicate that they also are applicable to rolling steel.

The mill was developed by engineers of the Lewis Foundry & Machine division of the Blaw-Knox Co., under the direction of Frank R. Krause, the inventor. Instead of the material passing through power driven rolls, the material is held in tension by a gripper, and the rolls are moved by frictional contact between cam plates and the metal between the rolls, approximating "turks head" rolling. The rolls are not driven by direct application of power through spindles. Their motion and pressure are produced by the action of reciprocating cam plates. The cam plates and the housing that hold them in position, apply pressure on the work stroke in the direction of the finished end of the material. No pressure is applied on the return stroke. The reduction is accomplished largely by the tension in the strip in contra-distinction to other roller-forging methods, which work the stock under high compression.

Another reciprocating-roll mill, in which the rolls move at right-angles to the strip movement, is the Simons unit, described in THE IRON AGE, *May 7, 1942, p. 76. In the Tube Reducing unit for heavy drafts on tubing, the material is indexed forward through revolving reduction cams.—Ed.*

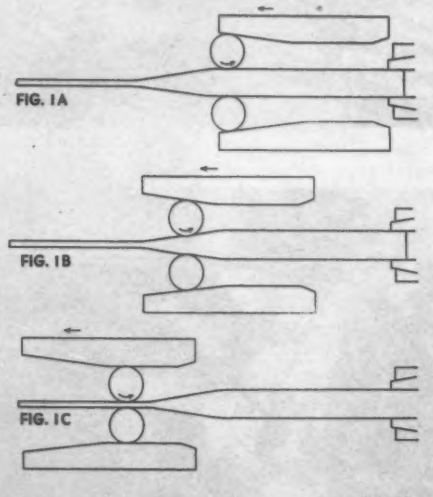
The process now is being used for reducing 0.5-in. material up to 26 in. wide down to 0.030 in. gage in a single pass. In conventional mill practice, such reduction usually requires four to six passes with at least three anneals for brass. The same equipment can be used to roll to much lighter gages, as low as 0.005 to 0.010 in., as well as to reduce 1 in. thick slabs to 0.050 in. Hot reduction of slabs up to 4 or 5 in. also may be undertaken with suitably designed equipment. The rolling of tapered material, such as spring leaves, and some types of shapes also appears to be adaptable to this type of mill. An interesting possibility is the formation of tapered skin covering for wings of aircraft.

Fig. 1 is a schematic representation of the action of a Krause mill with the drive and structural details omitted for clarity. Angles of the cam plates and thickness of the rolled material have been exaggerated.

The material, which can be handled in lengths up to 25 ft., is held in the gripper at the right. This gripper keeps the material under tension during the working stroke of the mill. It is moved by a screw which permits it to feed the material at the desired speed.

o o o

FIG. 1—The action and layout of the cam shape in the Krause mill are illustrated here. Fig. 1a shows the mill in starting position, while 1b and 1c show subsequent positions in the reduction of strip thickness.



At the beginning of the working stroke (Fig. 1a), the rolls are in a position slightly behind the previously rolled material. They are backed up by the cam plates which in turn are held in the mill housing. Since the cam plates are rigidly held in the mill housing, the rolls are rotated as the housing moves in the direction of the arrow and pressure is applied as the thicker portions of the cam plates come into contact with the rolls.

Fig. 1b shows the rolls and cam plates partially through the working stroke and indicates the action of the rolls on the metal.

After completing the desired reduction, portions of the cam plates which are parallel to the material pass over the rolls and the rolls perform a finishing pass over a portion of the previously rolled material. Near the end of the stroke, Fig. 1c, the cam plates have a slight reverse angle to release the pressure of the rolls.

At the end of the working stroke, a cam operated mechanism withdraws a wedge from the lower cam plates. This drops the lower roll sufficiently to permit the rolls to be returned to their original position in preparation for the next working stroke.

The screw which moves the gripper, shown in Fig. 2, has in the meantime fed the material forward so that an unrolled portion of the bar is in position for rolling. The rolled material as it comes from the delivery end is coiled.

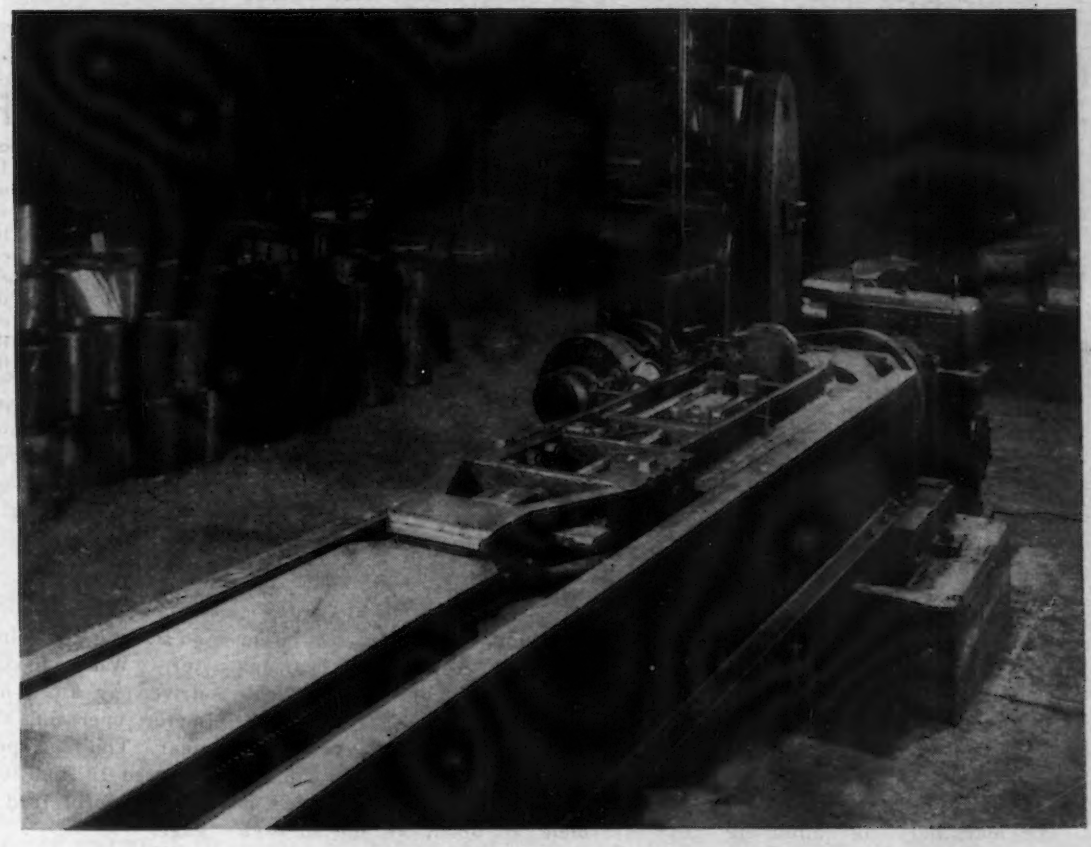


FIG. 2 — The feed drive and gripper arrangement are shown here. The rolling action of the mill is toward the gripper.

o o o

The two 28-in. mills installed for commercial production early this year, erected at the plants of the C. G. Hussey Co., Pittsburgh, and the Michigan Division of the Revere Copper & Brass Co., Detroit, are similar in their main features but differ in their motors and auxiliary equipment in conformity with the facilities available at the plants and the requirements of their owners.

Construction of these mills followed 10 years of research work by Mr. Krause and extensive experimental operations with a 10-in. mill erected at the plant of Lewis Foundry and Machine at Groveton, Pa.

A description of the mill installed at the C. G. Hussey plant reveals the essential features of the process which are common to both. Fig. 3 shows a general layout of the mill, while Fig. 4 shows major details of the mill stand.

The rolls used are 4 in. in diameter and 28 in. long and are high carbon, high chromium steel forgings. Since no pressure is placed on the roll necks other than that necessary to keep them in position, plain bronze bearings are provided. The cam plates are heat treated alloy steel forgings.

The mills provide a solution to the rolling problem of being able to exert great pressure with rolls of small diameter. The use of backup rolls provided one solution of this in wide strip mills, but the rolls in four high mills still suffered from the limitation that they are supported by bearings at the roll necks and some distortion is inevitable when great rolling pressures are required.

In the Krause mill there is no pressure on the bearings at the roll necks.

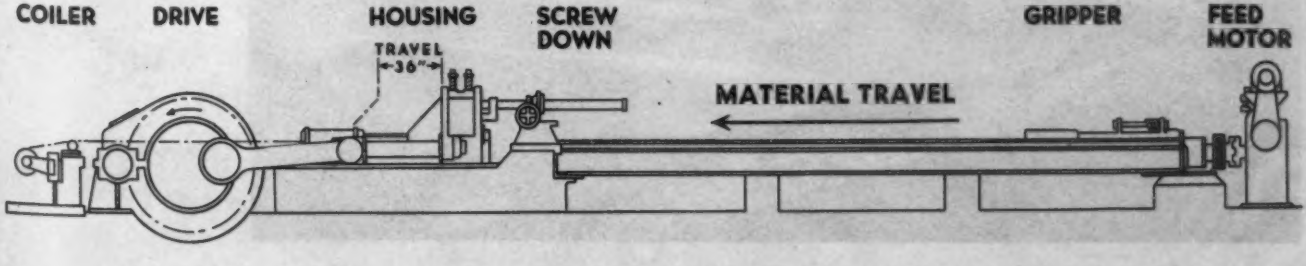
o o o

FIG. 3—This shows a schematic layout of the entire mill at the C. G. Hussey plant. The general layout and principle of this mill is identical to that of the Revere mill at Detroit, the difference being in auxiliary equipment.

The entire pressure is distributed evenly along the faces of the rolls by the cam plates which, with the backing-up structure of the housing, can be made as massive as is necessary to exert the desired pressure without distortion.

The housing for the rolls and camplates is massive in construction. It, with its attendant reciprocating parts, weighs 10 tons. Two manually operated screw downs, which move wedges, are provided for setting to the desired gage to be rolled. These can be seen in Fig. 5. A clutch permits independent operation of the screws. The gage may be changed while rolling and, if desired, a single bar may be finished out in several thicknesses for jobbing work.

A system of wedges between the cam plates and the plates on the mill housing provides for adjustments. Four wedges with indicators on the screws graduated at 0.001 in. permit deflection of the cam plate to give the effect of a crowned roll. In actual operation, it has been found that few



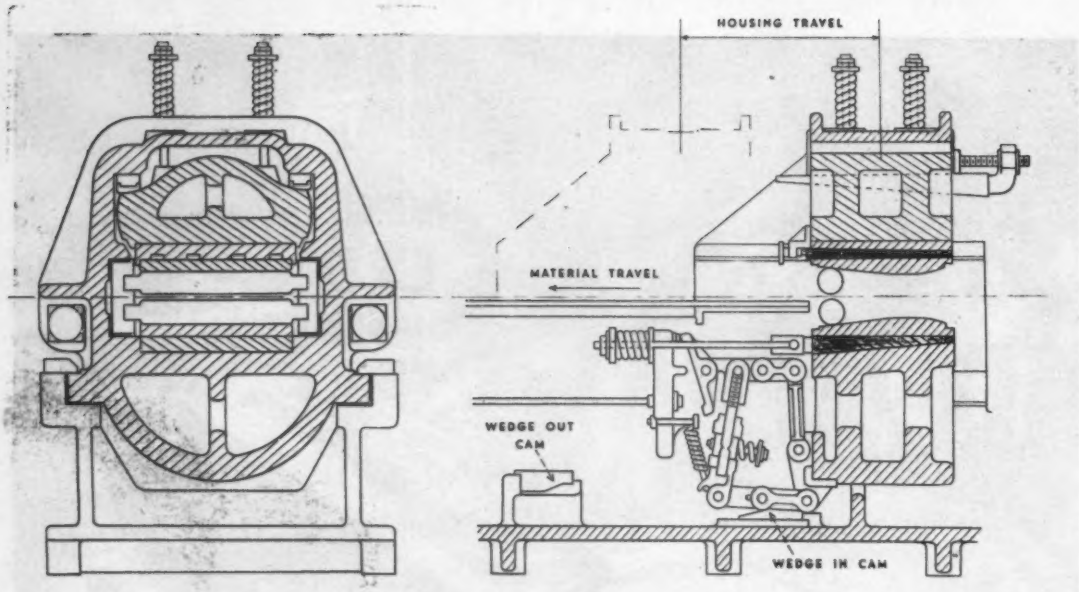


FIG. 4—The major details of the mill stand are illustrated here. The gripper and feed drive is to the left, while the position of the rolls against the cam plate are shown at right. The upper shaded area is the cam plate flexing wedge and the lower shaded area the mill return release. The mill screw-down is the wedge arrangement at the top.

adjustments are necessary. Because of the relatively slow delivery speed, the rigidity of the housing, and the ability to change screw settings quickly, gage control can be kept very exact both from side to side and from end to end.

The machinery for imparting the reciprocating movement to the housing consists of a motor directly connected to a crank drive, with connecting rods mounted on crank pins integral with the gears, and cross heads directly connected to the mill housing. The length of stroke may be either 36-in. or 32-in. Anti-friction bearings are used on the mill drive and connecting rods.

In actual production, the peak load has been found to be 150 to 175 hp. for material 16 in. wide, which is equivalent to about 10 hp. to each inch of width.

The gripper jaws which feed the bars and which keep them under tension during the working stroke of the mill, shown in Fig. 2, are pneumatically operated and are moved by a screw 36 ft. long and 6 in. in outside diameter. When feeding, the screw is driven by a 7½-hp., 1160-rpm., a.c. motor, operating through a reducing gear. The feed speed is slow, varying between 15 and 30 in. per min., the exact rate of feed depends upon the gage.

After being rolled, the material goes to a blocker or reel which has a 10-in. collapsing drum and can handle a maximum coil 20 in. in diameter.

Strip rolled by the Krause method is said to show a fine and very even

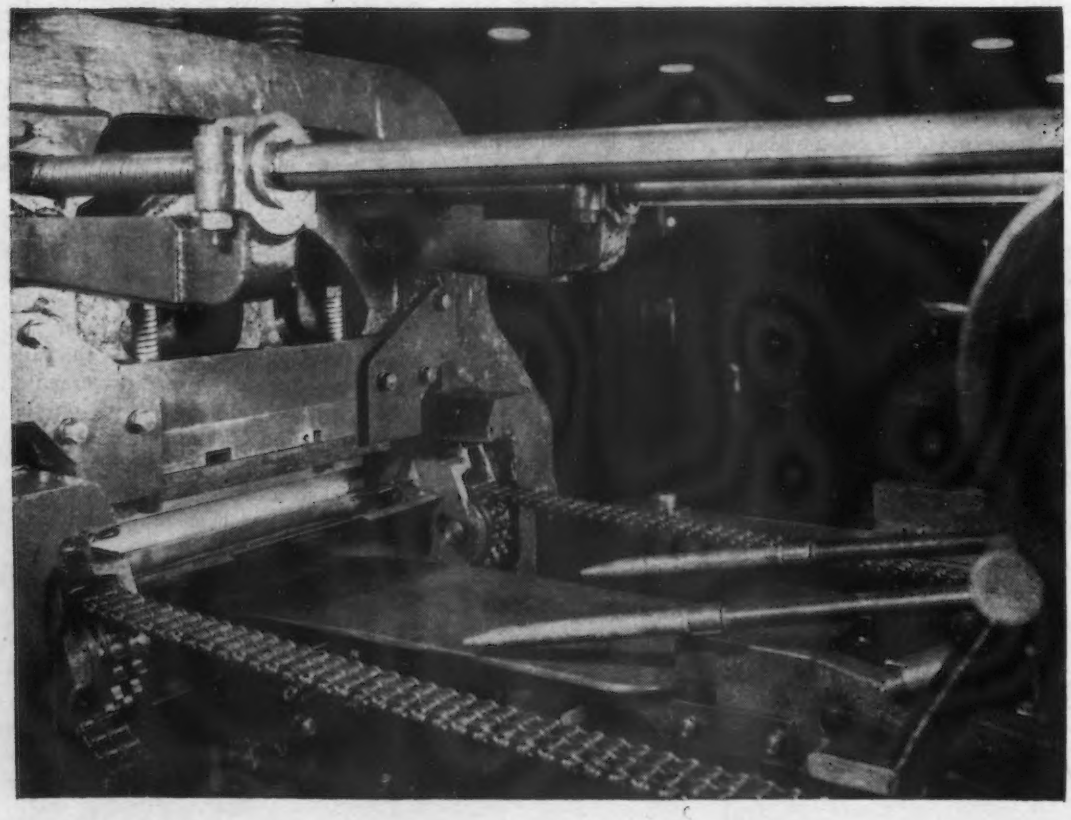


FIG. 5—The roll position and the upper screw down guide arrangement are shown here. The screw down bar, shown at the top of the photograph, also acts as a guide.

grain structure, with very little edge cracking in copper.

The production of the Krause mills now in use in rolling 26-in. wide material at 60 ft. per min. from ½ in. thick to 0.030 in. is 3000 to 4000 lb. per hr. This could be increased by 50 to 100 per cent by welding bars end to end for continuous operation, which is now in process of development by Lewis engineers. Such a change will involve the substitution of a system of roller or hydraulic feeding for the present method of holding the bars in a screw actuated gripper. A further increase in production can be attained by speeding up the mill above 60 strokes per min.

Precision Work on Old Lathes Permitted by Attachment

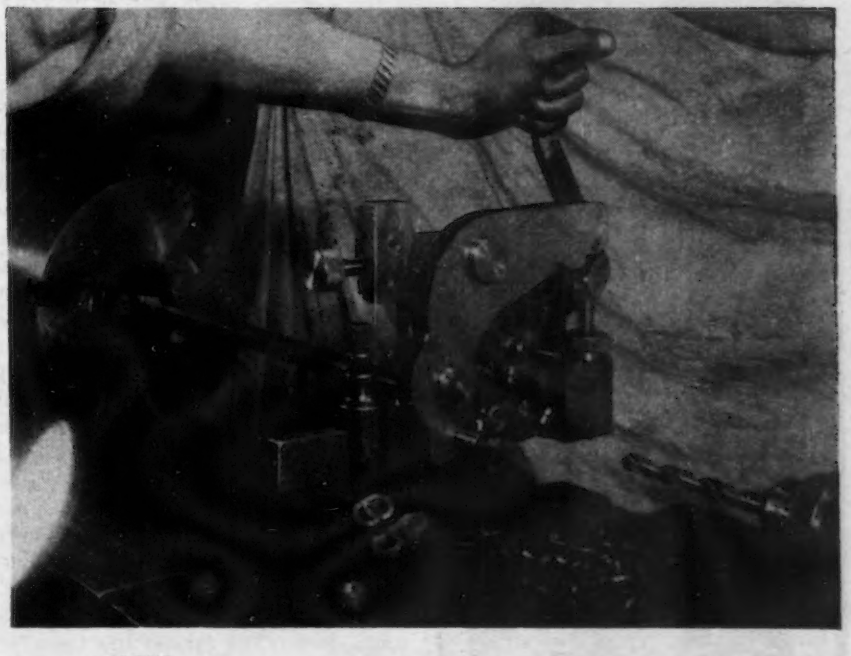
A COMBINATION tool holder and follow rest which has been designed to overcome the difficulty encountered in turning or threading long shafts of small diameter has been developed by Blank & Buxton Machinery Co., 3100 East Michigan Avenue, Jackson, Mich.

Known as the Micro-Turnthread, this tool holder, installed in the lathe tool post, includes rollers with screw adjustment for variation in work diameter and a micrometer adjustment of the setting of the cutting tool itself. The attachment is aimed to permit precision work on old lathes which otherwise would be unsuitable for close work. It holds the work centrally and work can be performed on shafts several feet from the chuck without any tailstock support, Fig. 1.

A model A attachment is available for right or left hand turning. This design is intended primarily for turning and threading, Fig. 2. It is also suitable for light forming and cutoff operations. The follower rolls are adjustable for diameters from ½ to 2 in.; the cutoff capacity is 1¾ in. solid. Tools used in this model are ground from ⅜ in. square tool bits.

The right hand attachment has the tool following the rolls and is used on finished shafts, whereas on the left hand model the tool precedes the rolls.

[CONCLUDED ON PAGE 136]



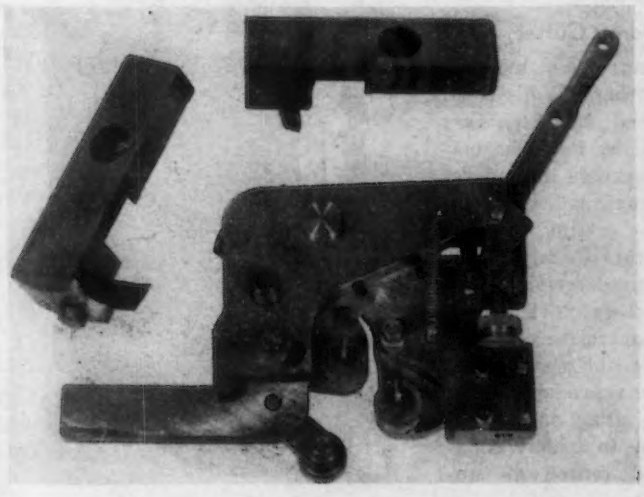
ABOVE

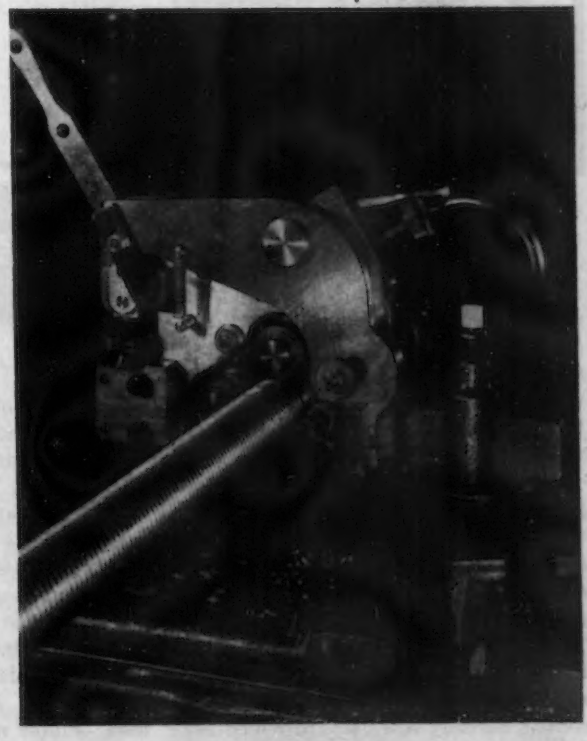
FIG. 1—Quick retraction feature of lathe attachment enables easy cutting of washers. The work can be done a long way from chuck without tailstock support.

o o o

BELOW

FIG. 3—Quick change of tools is accomplished by having a separate tool holder for each tool. (Model B.)





ABOVE

FIG. 2—Acme threads being cut with a left hand attachment on the Micro-Turnthread.

New Equipment . . .

Welding

. . . Recent developments in resistance welding controls, flame cutters, electrodes and other welding accessories are described in the following pages.

AN electronic forge-pressure timer has been incorporated in the General Electric line of capacity discharge controls for use with stored-

energy type resistance welding machines. Designed for dual pressure spot welding machines of the capacitor discharge type, the timer functions to supply accurately timed forge pressure. Calibrated in milliseconds, the timer consists of a timing circuit with a regulated d. c. source of voltage to assure accurate timing, the necessary electronic tubes and a time delay relay with fixed timing for compensating for the delay in the operation of the solenoid valve on the welding machine so that the forge pressure can be applied precisely at any point during the current discharge. The timer is mounted on a small steel base so constructed that it can be added to any G-E capacity discharge control already installed, provided the resistance welding machine has a dual pressure system designed for this purpose.

Circuit Control Panel

AN improved circuit control panel for tack welding, the Wilson Type 30 special tack welding circuit control panel, has been announced by *Air Reduction*, 60 East 42 Street, New York 17. The resistors of round Nichrome wire are mounted on insulators and are designed well within the permitted temperature rise. The mounting brackets are arranged so that panels can be mounted side by side or one on top of another without restricting circulation. Current values are controlled by specially designed contacts and are adjusted by turning fiber handles tight against a copper bus bar to connect the various resistors into the circuit, output current being the sum of the resistors so connected. Panels are available in 150 and 230 amp. sizes. The former has taps for 10, 20, 40 and 80 amp., and the latter has taps for 10, 20, 40, 80 and 80 amp. Current adjustment on both units is possible in 10 amp. steps.

Electronic Flame Cutter

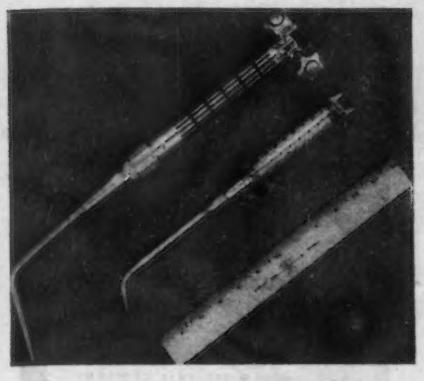
AN automatic electronic flame cutter, the Struthers Wells ISC, has been announced by *Struthers Wells Corp.*, Titusville, Pa. The machine translates markings into movement and its electronic control accurately guides the cutting torches along any desired contour in a horizontal plane as predetermined by markings placed on cylindrical records. The plastic control records are small, light, durable and easily handled. Plates may be reproduced from the original records either successively, intermittently or in widely separated locations and reused an unlimited number of times. Where duplicate work is done in separate plants, the records can be transferred from one plant to another for duplication of the job as originally laid out.

Outdoor A.C. Welders

TWO new outdoor a.c. welders, a 500-amp. type and a 300-amp. type, specifically designed for use in shipyards and similar outdoor locations where exposure to the weather is common, have been announced by *General Electric Co.* These welders are equipped with an "idlematic" control which reduces the output voltage automatically to less than 30 volts whenever the arc is not in operation, yet provides full power for welding directly when the arc is struck. The control is provided with a switch for shutting off the welder when not in use. The dripproof construction of all openings in the top of the sturdy enclosures of the welders and a sealed window over the current indicator provide protection against the entrance of rain, snow and sleet. Other features include ventilating openings which serve both to shed water and to keep air velocity low and a special finish on all internal parts for protection against corrosion from moist air.

Welding Torch

A COMPACT lightweight welding torch especially designed for delicate precision work on "hard-to-get-at" light metal work up to ¼ in.



in thickness is announced by the *National Cylinder Gas Co.*, 205 W. Wacker Drive, Chicago, as part of its Torchweld line of welding and cutting equipment. Weighing 8 4/5 oz., complete with a commonly used size of tip, this torch, called the Aircrafter, is less than 12 in. long and has a handle ⅞ in. in diameter and 4 4/8 in. long. Two types of copper tips, both producing soft, medium-pointed flames that give deep penetration without blowing hot metal, are offered and both can be swiveled to any position. The tip head for screw-in style tips is made of special heat resistant cupro-nickel. Mixers incorporate the patented "non-flash" Torchweld principle.

A.C. Electrode

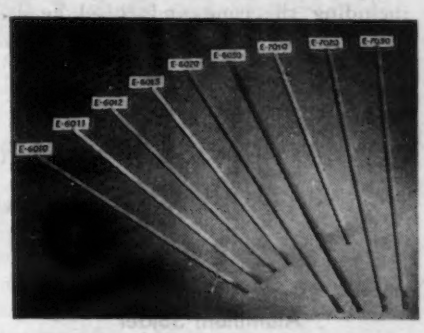
A SHIELDED arc electrode for mild steel specially made for operation on a.c. has just been announced by the *Lincoln Electric Co.*, Cleveland. Designated as Fleetweld 35, the electrode will also operate on d.c. with either polarity. Available in ⅛, 5/32 and 3/16 in. sizes, it is claimed that Fleetwood 35 has exceptionally high physical properties. The as-welded weld metal specimens testings are as follows: tensile strength, 62,000 to 70,000 lb. per sq. in., yield strength, 52,000 to 57,000 lb. and ductility (elongation in 2 in.), 23 to 30 per cent. The electrode is made in standard 14 in. lengths and is packed in 50 lb. containers.

Light Gage Electrode

AN improved a. c.-d. c. electrode for light gage metal welding, Airco No. 90-A, an improved version of the smaller sizes of Airco No. 90, has been announced by *Air Reduction*, 60 East 42nd Street, New York 17. The electrode is especially designed for welding light gage chrome-moly and similar steels used in aircraft welding. It is made to a new coating formula that is said to provide smoother arc operation, better appearance of deposits, stronger arc action, reduced slag interference and excellent operation at high currents without deterioration of coating at stub end. Available in 1/16, 5/64 and 3/32 in. diameters, the electrode is said to be equally efficient for straight or reversed polarity. Test specimens welded on SAE 4130 with Airco No. 90-A electrode show transverse tensile strengths of 80,000 to 90,000 lb. per sq. in.

Arc Welding Electrodes

A LINE of smooth-flowing arc welding electrodes with quiet arc characteristics has been announced by *Allis-Chalmers Mfg. Co.*, Milwaukee 1. The electrodes, both a. c. and d. c. types, are identified simply by the standard American Welding Society number, such as E-6010, for the reverse polarity, cellulistic coated rod for all position d. c. work, and by color of the coating, thus aiding selection and handling. A new bulletin, B6340, describes the electrodes.



Stainless Steel Electrode

A STAINLESS steel arc welding electrode that performs equally well on a. c. or d. c. in all positions has been announced by *Alloy Rods Co.*, York, Pa. The electrode is said to have exceptionally low spatter loss, easily removed slag and instant arc establishment. Welds made in the flat, vertical and overhead positions are of accepted contour. Physical and corrosive resisting properties are said to meet all requirements.

Welding Rod

AN improvement in its gas welding rod, EutecRod 195, for the salvaging of zinc die castings has been announced by *Eutectic Welding Alloys Co.*, 40 Worth Street, New York. The rod has a lower melting point and a still lower bonding temperature than the original alloy, which make it easier to apply without danger of damaging the parent metal. The improved rod is also easier to build up with, has greater tensile strength and matches the hardness of the die castings. The accompanying picture of a zinc base fuel pump die casting which had the whole top section broken off illustrates what can be accomplished with EutecRod 195.

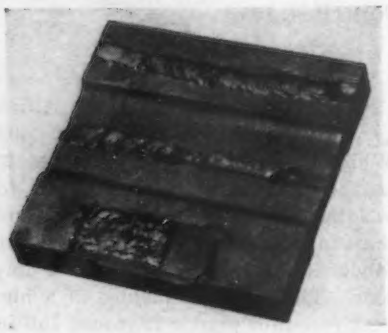
Electrode Holder

JUST announced by the *Allison Tool & Engineering Co.*, 4031 Whittier Boulevard, Los Angeles 23, is the Allison electrode holder for welding. Model A is a 19 oz. unit built to handle 300-500 amp. work and Model B a 6¼ oz. holder for 200 amp. jobs. The holder is molded of a high heat resistant plastic to insure full insulation and to eliminate all possibility of arcing due to slag, moisture or contact with grounded surfaces. Compactly constructed, the holder incorporates only three parts, the handle, cable connector and tip. Designed for either mechanical or solder cable connections, the holder also features quick change and permits burn-

ing of electrodes to within ½ in. of the holder tip. Left hand threading in the tip and handle connection securely grips the electrodes and prevents their slipping.

Aluminum Electrode

A COATED electrode, EutecTrode 2100, for use in the arc welding of aluminum sheet and castings has been announced by *Eutectic Welding Alloys Co.*, 40 Worth Street, New York. EutecTrode 2100 is said to open a new field for arc welding in the salvage and reclamation of aluminum castings because it is possible to add metal with this new electrode without completely preheating the casting and particularly without danger of overheating the metal adjacent to the weld. The electrode is also said to speed up and simplify the joining of aluminum sheet because of its extremely high rate of fusion. Slag can be brushed off by simply wire brushing the weld. EutecTrode 2100 is available in ⅛, 5/32 and 3/16 in. sizes.

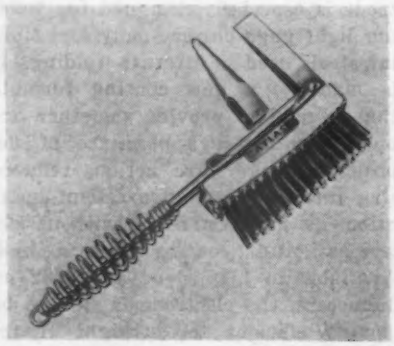


Rod Washer

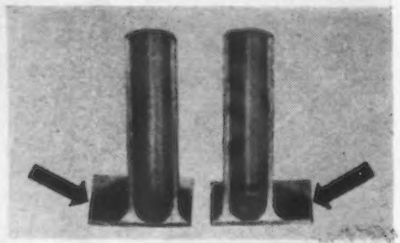
CAPABLE of 24-hr. service, the welding rod washer introduced by *Aufhauser Brothers Co.*, 295 Madison Avenue, New York, is designed to salvage and reclaim scrap welding rods at the plant of the electrode manufacturer. The washing tank has built-in steam heating and special drain plug to facilitate cleaning. Each machine is equipped with two sets of baskets, four for 14 in. rods and two for 18 in. rods. One set may be loaded during the time the other set is operating. Cleaning time for unbaked rods is 4 min. and for baked rods, 10 min. Capacity is 500 lb.

Weld Cleaner

A WELD cleaning tool combining a wire bristle brush and a slag removing head in one unit, the Atlas Model A Dual-Tool, has been announced by *Atlas Welding Accessories Co.*, 14824 Wyoming Avenue, Detroit



21. The tool features a brush holder which permits removal of the brush for reversing or replacement by inserting the screwdriver at the rear end of the holder. Up and outward pry releases tension and the brush pops out. Reverse action is used for inserting and the brush snaps to a firm, rigid seat. The Flex-O type spring steel handgrip permanently welded to the handle eliminates the possibility of loosening or breaking. The chipping head is hand-forged tool steel. Every part of the tool is replaceable including the cone and chisel heads.



Aluminum Solder

A FREE flowing solder for aluminum, EutecRod 199, which supplants the alloy previously known as EutecRod 19B, has been announced by *Eutectic Welding Alloys Co.*, 40 Worth Street, New York 13. Used with Autochemic Eutector Flux 199, EutecRod 199 will flow on aluminum as readily as ordinary lead-tin solder on tin plate, brass or copper. In long laps it will make joints of moderate strength but should generally be used as a seal. EutecRod 199 is suitable for application where the complete joint will not be heated over the boiling point of water (212 deg. F.) under working conditions. Its low temperature of application, 400 deg. F., makes it possible to join thin sheet metal without danger of distortion.

Welding Fume Hose

A HOSE designed to speed welding operations in ship hulls by providing workers with unremitting supplies of fresh air through the vacuum carry away of fumes has been announced by *Goodyear Tire & Rubber Co.* Named "Hull-Vent," the hose is constructed with a synthetic rubber covering which resists damage if live flame from acetylene torches or other sources comes in contact with it, previously a barrier to use of any other types of air conduit except metal. Hull-Vent has a flexible wire-reinforced construction to resist damage from sharp bends and kinking.

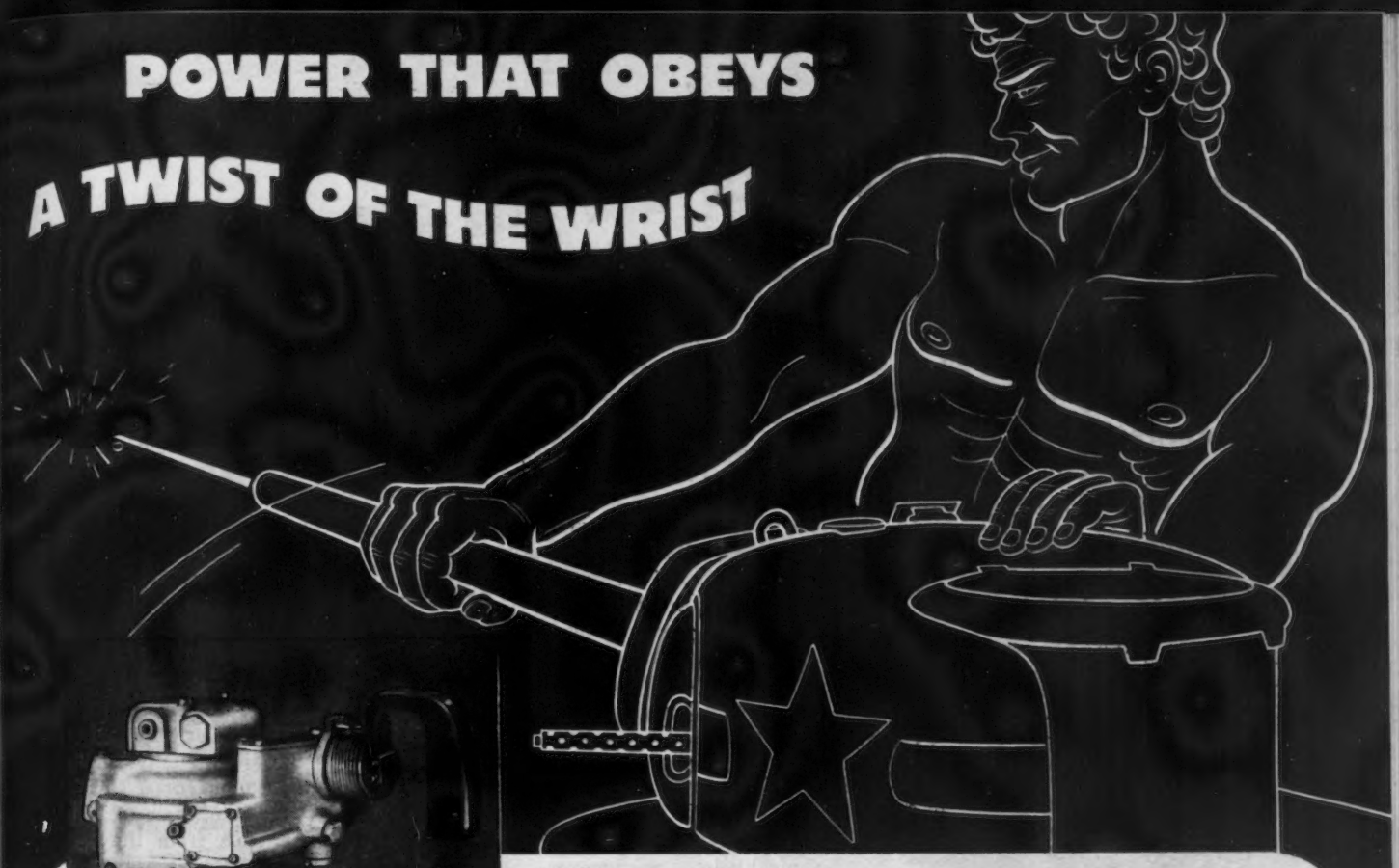
Welding Calculator

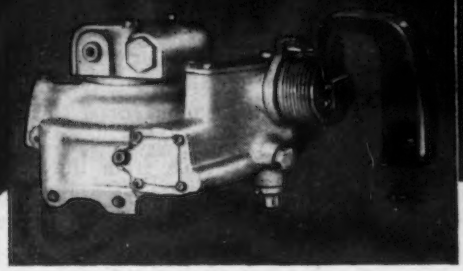
A CALCULATOR designed for readily determining the welding preheating and interpass temperatures of steels which have a high carbon and alloy content and require preheating to minimize the tendency toward excessive hardening and possible cracking of the base metal adjacent to the weld has been announced by the *Lincoln Electric Co.*, Cleveland. The calculator is 6¼ in. in diameter. It sells for 25c.

Welding Goggle

AN improved Duraweld goggle designed to provide better protection and greater comfort for welders' eyes has been announced by the *American Optical Co.*, Southbridge, Mass. The goggle is fitted with Noviweld lenses. Optional equipment includes, Filterweld, Noviweld, Didymium or "Super-Armorplate" Calobar lenses.

POWER THAT OBEYS A TWIST OF THE WRIST





Oilgear generator (pump) which supplies fluid power to an Oilgear motor for traversing turrets in all tanks mentioned and many others. These Oilgear systems provide high traverse speed, exceptionally accurate control and dependability.

Oilgear's EAGER RESPONSIVENESS MAY WIN A POSTWAR BATTLE FOR YOU

Alert and forward-looking "peace" machine designers and users are finding new paths to efficiency by watching the performance of machines of war . . . at war. Take for example, America's newest M3 and M5 light tanks and M4 mediums. Here, in all these, is power at the twist of a wrist, supplied by Oilgear Fluid Power systems, to enable the gunner to traverse and train the turret (and guns) on the target, quickly, accurately and without effort. He gets extreme speed instantaneously when searching out a new target. He gets extreme deceleration when he has found it, and low tracking speed as he trains his gun on the moving target or when he is moving past a stationary target. In brief, he has instantaneous torque, extreme range of speed, steplessly variable speed from zero to maximum and return. He has tremendous power in small compass. He has absolute control over power and speed, in this case, from a simple handle which he twists from side to side. Whether *you* need *these* Oilgear characteristics or a combination of scores of other functions to improve a machine, better its operation or solve a hitherto "impossible" problem, write and ask Oilgear engineers for their recommendations. There is no obligation of course. . . . THE OILGEAR COMPANY, 1303 West Bruce Street, Milwaukee 4, Wisconsin.

ARE YOU TRYING TO:

1. Apply large forces through long . . . or short . . . strokes at variable speeds?
2. Obtain automatic work cycles, variable speeds in either direction . . . with or without pre-set time dwell?
3. Apply large forces through continuous or intermittent reciprocating cycles at constant or variable velocities?
4. Obtain extremely accurate control of either position or speed of a reciprocating member?
5. Apply accurately variable pressure either static or in motion?
6. Closely synchronize various motions, operations or functions?
7. Apply light . . . or heavy . . . forces at extremely high velocities through either long or short distances of travel?
8. Obtain continuous automatic reversing drives at constant R. P. M. or over a wide range of speed variation?
9. Obtain accurate remote control of speed and direction of rotation, rates of acceleration and/or deceleration?
10. Obtain constant horsepower output through all or part of a speed range?
11. Obtain automatic torque control?
12. Obtain accurately matched speed of various rotating elements?
13. Obtain constant speed output from a variable speed input?
14. Obtain full pre-set automatic control, elimination of problems of shock, vibration, etc.?

You Need Oilgear!

OILGEAR

Fluid Power

Assembly Line . . . STANLEY H. BRAMS

• If confusion seems to prevail in Detroit's viewpoints, credit it to underlying factors like competition, distribution problems, and the need for overemphasis to impress the Government.

DETROIT—Inadvertently or purposely, and probably the latter, the ability of the auto industry to reconvert, its plans for doing so, and its progress have all become about as obscure as a London fog and as uncertain as tomorrow's stock market. The reasons, of course, are largely competitive. The honeymoon of wartime cooperation between the auto industry producers still goes on. But the subconscious civilian-goods selves of those companies, like any objects of Freudian psychoanalysis, are playing their customary baffling game. The old days are here again, and so are the old ways, and the old game of blowing smoke in curious eyes.

We have the Automotive Council's George Romney worrying, quite sincerely before the National Industrial Conference Board that "the eventual price we will have to pay for the present idle talk about industrial reconversion will be idle men and industrial stagnation." Simultaneously, this evident auto industry policy line is breached by the observation of Nash president George W. Mason that most companies will be able to produce cars in 90 days from the time a go-ahead is given, and that his own company has its very last detail of reconversion planning ready to translate into action. Whispers, meanwhile, tell of a very few companies which may be able to get their first cars off their lines in 30 days or so, but others proclaim they will require at least six months.

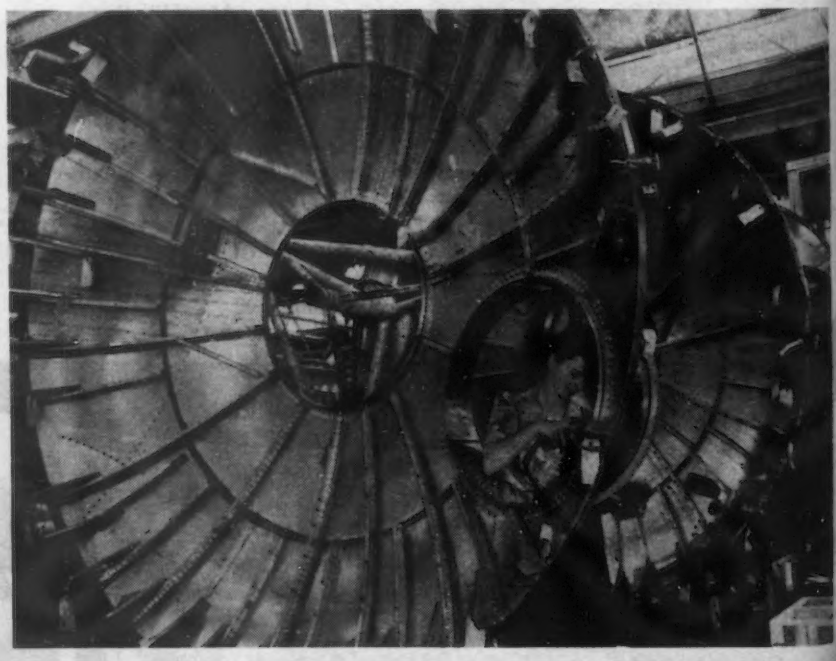
Explanation of these divergent view points? Elemental. Romney's objectives are to obtain the best possible terms for reconversion from the government. Mason's are to stimulate interest in Nash dealer franchises. Whisperers on the quick-conversion side have the same general idea. Other industry men who believe publicly that a long term will be needed feel that they do not have to worry so much about their dealer situations as about the need for spurring government action. Look at the cause and you have the effect.

Then there is the matter of utilizing technical help on changeover. Several auto companies sought permission from the War Manpower Commission to transfer a few hundred men apiece, and when a meeting was held the WMC finally announced a formula permitting transfer of up to one pct. of a payroll, provided war work was not impaired. One pct. was much more than any company had requested, but there was definite objection to WMC's statement that an "agreement" on this score had been reached. There was no agreement, for the auto firms did not want to be tied down to any definite figure, preferring instead to maintain war commitments and work out their own reconversion destinies.

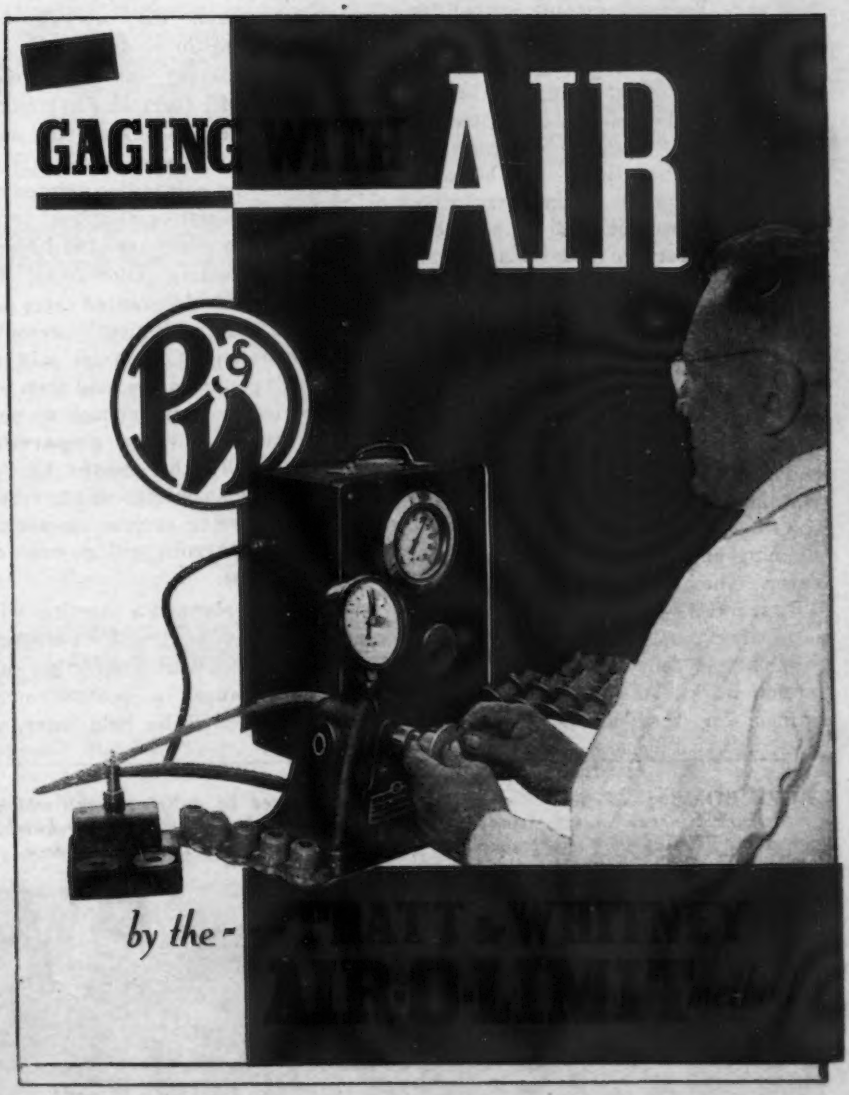
Explanation? The auto makers, by keeping to themselves the number of men working on changeover, rather than having that quantity known to all competition, could better succeed in their hope of surprising their civilian goods rivals.

AS if surface inconsistencies were not enough, Detroit is widening the scope of its own silly season by conjuring up conundrums. The auto companies fret over their inability to buy machine tools from the government; government says their worries are overdone and brings out regulations to prove it; the auto people say the regulations are still unknown to many who should be using them. A columnist whose rumor-peddling is said to have the SEC looking interestedly at his writings and stock account, indicates, with qualifying nose-lifting, that the Fisher brothers may buy the Olds division of General Motors. (Not long before this same

GIANT PINWHEEL: *A fixture to hold bulkheads for B-29 pressurized cabins being manufactured at Hudson Motor Car Co. revolves to bring the work to the operator. The bulkhead shown, incidentally, graphically indicates the size of the Superfortress cabin.*



LATEST INFORMATION
on the P&W Air-O-Limit Internal Comparator



New free bulletin just off the press gives you complete facts and figures on this swift, accurate, dependable gage that has broken many a war-time production bottleneck.

AN AIRPLANE engine manufacturer speeded up the I. D. inspection rate of his master-rod bearings by 500% with the P&W Air-O-Limit Internal Comparator. *Yet the gage never touched the inside of the bearing!* That's because the Air-O-Limit gage works on the "air gap" principal . . . compressed air is forced through tiny nozzles at the end of a spindle, and when the bearing is slipped over the spindle the back pressure of the compressed air is registered on a precision pressure indicator calibrated to read in "tenths." Other Air-O-Limit models omit this non-touching feature, but operate on the same principle. All of them have been doing a man-sized job on the war production front and will keep right on giving swift, accurate readings as industry swings over again to peacetime output. This newest bulletin has the complete Air-O-Limit story from A to Z . . . it is free to any executive who requests it on his letterhead.

Write for this new bulletin.

PRATT & WHITNEY
Division Niles-Bement-Pond Company
WEST HARTFORD 1, CONNECTICUT

source was vaguely reporting the Fishers at the head of a great new auto combine into which the Briggs name was woven.) One company, so other shadowy stories go, is absolutely unable to make any changes in immediate postwar models because it has a half-year's supply of fenders stacked up neatly in some warehouse no one has ever seen. Another firm—each fantastic story has its counterweight—has every last supply bin emptied, and so plans a completely new car. Some companies figure that postwar deflation will make their low-priced cars positive best-sellers; others figure that enlarged purchasing powder will make the biggest market in history for the expensive makes.

Write your own ticket—but be careful of believing the bookmakers! By the time the weight of dealers, stockholders, competitive situations, human frailties and worries over governmental policies and interference are thrown into the scale along with the story being told, its weight is grotesquely out of proportion.

Separation of the grain and the chaff on reconversion progress is not impossible. For instance, let it be postulated as a basic fact that the first major problem of changeover planning and execution today is manpower. Then let conclusions be drawn.

First WMC has taken its action of permitting each auto company to shift one per cent of its men to reconversion work. As it turns out, it remained for the Detroit Production Urgency Committee to ratify this action before it meant much, but this now has been done. The PUC approved applications of Fisher Division of General Motors, Chrysler and Ford to develop experimental models, but the announcement did not specify numbers of men to engage in this work. This indicated that if some companies reach a point where they need more than one per cent of total pay rolls for development work—as might occur in the ranks of the smaller concerns—they may be able to get approval for so doing.

Of equal interest was the development of a WMC formula for transfer of technical help in engineering companies to reconversion work. When the engineering companies pointed out to WMC that their employment totals today are somewhat more than 50 per cent under ceiling allowances, the Commission quickly granted them permission to assign "limited" personnel to reconversion. Companies will report their open capacity, and then will be authorized to transfer men on open assignments to civilian preparatory work. Actually this means that if operating levels continue as at present in the engineering companies, around half of their payrolls will go onto reconversion jobs.

WMC then planned a meeting with representatives of the United Auto Workers Union, but conflicting appointments caused a postponement. This meeting will be held later, as will another conference scheduled with tool and die companies.

Meanwhile, top automobile officials went to Washington to meet with OPA on the question of future car prices. The OPA viewpoint is that prices should be held down to the 1942 price levels. The company viewpoint is that it is impossible to maintain the same price levels if quality is to be unimpaired. The meeting was definitely exploratory, but because no conclusions were reached it was regarded as none too satisfactory. What will next happen is that OPA will seek details of increased production costs from each company, and then will attempt to blend them into a formula, for either general or specific application to the companies.

So progress is being made. Manpower is being allocated to changeover planning. The details of clearing up contracts and clearing out floor space are progressing. Washington is allocating materials for reconversion and civilian requirements. All along the line basic policies are being laid down. Of course it could have been done earlier, and it should have been done earlier. But perhaps it is less fatalistic than a reflection of confidence in the auto industry's intense competitive spirit to say that when the road is opened for the passenger car production race, the quick starts of nearly all of the entries may surprise not only the spectators, but the other participants as well.

BUZZ BOMBS: ***This scene of devastation was caused by a flying bomb which struck Vincent Square, London. During the 80-day battle of the flying bomb, some 2300 of 8000 robots launched against Britain fell in the London area.***

Auto Heads Met With OPA To Set Car Price Policies

Washington

• • • **The heads of** automobile companies met with OPA Administrator Chester Bowles at his invitation on Sept. 20 to discuss policies to be followed in establishing new passenger car and truck prices.

Automobile men said that while increased costs will undoubtedly push new vehicle prices up, because of the confusion in the minds of steel producers and other suppliers about postwar prices, they had not been able to estimate postwar costs.

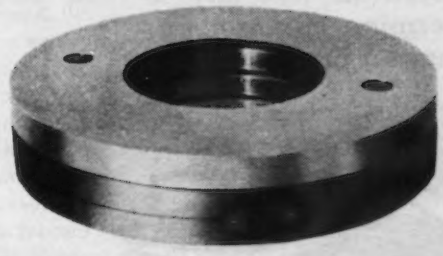
Some suppliers are quoting prices 10 to 15 per cent above OPA ceilings for postwar delivery; others say they cannot quote prices because they do not know what OPA is going to do.

OPA officials say that it is probable that prices will be established on an individual company basis because the financial position of each manufacturer is different.

How One Plant Solved the Tool Steel Selection Problem

PRODUCTION BOTTLENECK BROKEN

A prominent metal parts manufacturer first became acquainted with Carpenter Matched Tool Steels because of a tool-caused production bottleneck. A shaving die used in a punch press operation wore rapidly and would not hold size. An oil-hardening steel had been tried but it lacked the necessary wear resistance. When Carpenter Hampden was selected for its maximum wear resistance and accuracy in hardening, production was increased from 99,600 to 504,000.



BREAKAGE ELIMINATED

After the first successful experience with Carpenter Matched Tool Steels, the tool room tackled another job. A staking punch used to stake nuts on a spindle had a short life that averaged 40 hours. The oil-hardening steel used, either failed by breakage when treated for maximum hardness, or battered out of shape when drawn for greater toughness. No. 11 Special, a tough timbre, straight carbon water-hardening steel, was tried with excellent results. Punch life went from an average of 40 hours to more than six months service, and punch was still in good condition at the end of that time.

TOOL LIFE UP 66%

Confidence in solving tool problems with Carpenter Matched Tool Steels increased with results and inspired a search for improved performance on other jobs. High speed steel had been used for a burnishing punch. The selector section in the Carpenter Matched Tool Steel Manual recommended K-W (Water-Wear) for burnishing tools. The slick glass-hard surface provided by K-W gave a smoother, cleaner finish and tool life was increased 66%.

Lower Unit Costs and Increased Output Result from Carpenter Matched Tool Steels

These examples show how Matched Tool Steels provide an easier method of selecting tool steel to meet specific requirements, or to get improved results.

Many plants have discovered that this method of tool steel selection has many advantages—protection against hardening failures and premature service failures—greater freedom from tool troubles and very substantial increases in the service life of tools. If you are looking for a chance to lower unit costs and increase output, re-examine your tooling problems now with the help of the Carpenter Matched Tool Steel Manual. Write on your company letterhead, giving title or position, for your copy of this helpful 168-page manual

THE CARPENTER STEEL CO., 121 W. Bern St., Reading, Pa.

Carpenter MATCHED TOOL STEELS

Washington . . . L. W. MOFFETT

• Bureau of Labor survey forecasts serious unemployment for big war production cities despite speed of reconversion . . . Buffalo studied as test city to determine contract termination effects.

WASHINGTON—Serious unemployment is the nearby economic outlook for big war production cities after elimination of war contracts if a recent survey of Buffalo by the Bureau of Labor Statistics accurately forecasts postwar conditions. Buffalo may have 50,000 out of work unless new civilian industries come into the city.

This will be true, BLS says, even though most manufacturers in the test area believe that reconversion can be accomplished with little or no delay after the first big slash of government contracts comes.

According to the Bureau of Labor Statistics, WPB asked it to make the study in Buffalo as a "big war center" with greatly diversified industry. WPB felt the Niagara frontier area was typical of cities experiencing extensive wartime expansion and wanted an analysis of reconversion problems. Out of this analysis WPB felt might come the basis for plans to alleviate the problems and improve the prospects for other areas when X-Day arrives.

PREDICTING that Buffalo will shift from a Group I labor area with the manpower shortage very severe to a "Group I unemployment area," BLS said that recent aircraft cutbacks will release up to 25,000 aircraft workers by the end of the year. More than 60,000 aircraft workers are employed in the city.

Being a guinea pig will be no new experience for Buffalo. It was the first place where the Department of Agriculture tried out its Food Stamp Plan. WMC made the city its first life-sized laboratory in manpower control when the controlled referral plan was introduced.

BLS experts spent more than six weeks in Buffalo this summer. They questioned executives of more than 40 Niagara frontier firms engaged in war work in an attempt to learn their postwar plans. These companies employ more than 50 per cent of manufacturing employees in the area.

Postwar employment in the manufacturing industries alone, the survey disclosed, will fall 26,000 short of full employment. Companies plan pretty much to resume business at the old stand, and only six firms expect to produce brand new products.

The report said: "Most plants reported that they expected only moderate business gains over prewar levels. About half of the companies anticipated the same level of business as before the war, and only a few expected a substantial increase in business. Based on these plant estimates postwar manufacturing employment in Buffalo and vicinity is predicted at 31 per cent above 1939 levels, but a 50 per cent increase above 1939 would be necessary to assure the full employment goal of 175,000 set by the Niagara Frontier Postwar Planning Council."

AFTER sizable cutbacks more than one half of the plants can commence civilian production immediately, inasmuch as peacetime output is practically the same as their war production. About three fourths of the plants can schedule civilian production following relatively small increases in war orders.

Technical reasons will prevent some from reconverting unless they receive a 100 per cent cutback, the report points out. Others would not be able to go back to civilian production profitably unless they were released from 50 to 75 per cent of their war work, although several expressed a willingness to take a loss for a while if necessary.

Most could take on civilian orders at once after even a small cutback, 10 per cent or less, but most of these in turn would not welcome an immediate big reduction in war orders.

All prefer a gradual reduction of war orders which is contrary to Army and Navy plans. Advance plans for civilian production could then be developed and necessary layoffs during reconversion would be fewer.

PANEL HEAD: *David I. Cole, head of the steel panel of the War Labor Board.*

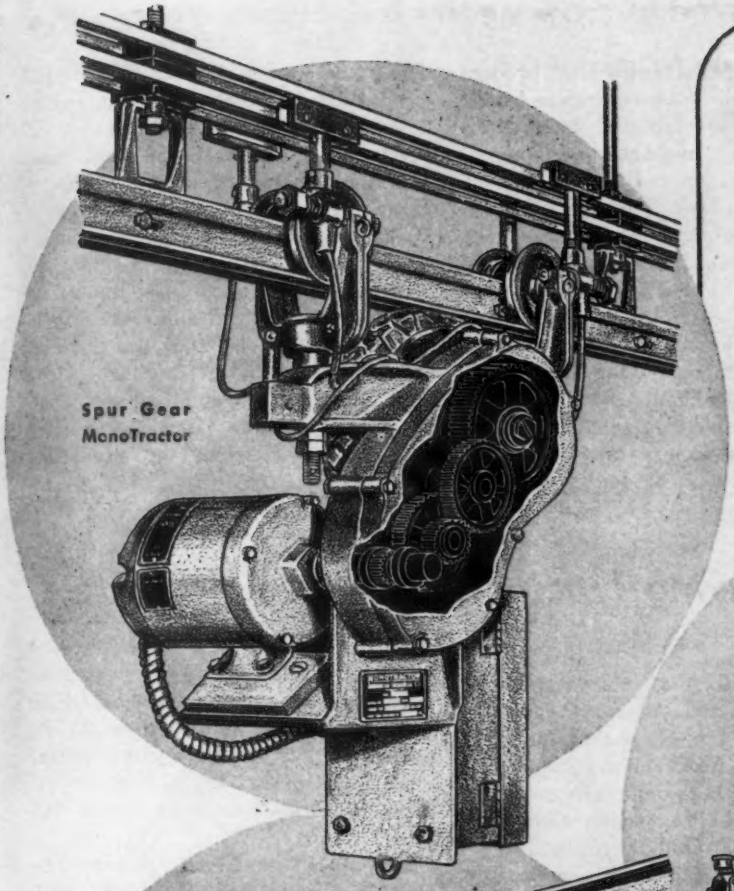
"However," continues the report, "most of the companies do not expect such well-tailored cutbacks. What they chiefly want from the government is adequate advance notice of contract terminations, prompt settlement of claims and removal of government equipment, together with prompt relaxation of material and manpower controls. The unions want planning for full employment and adequate unemployment insurance in the interim."

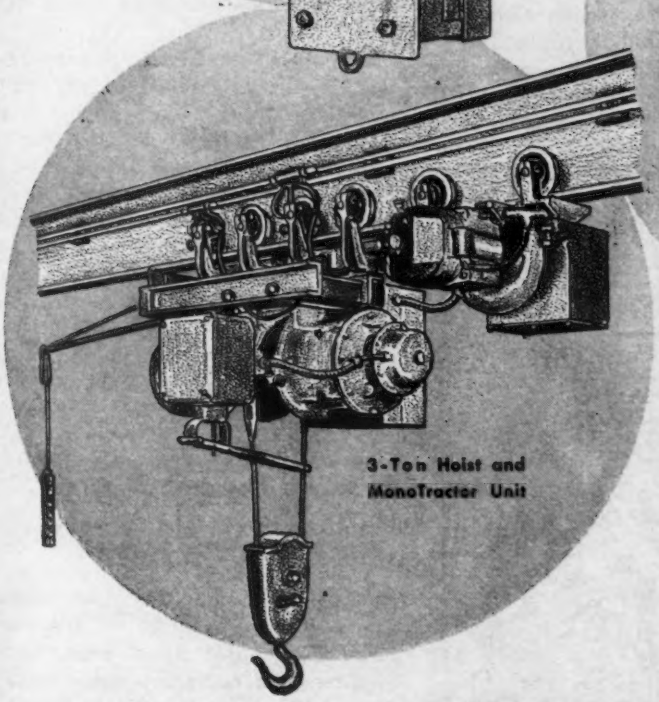
THE report shows that 16 of the companies have already suffered from one to 20 cutbacks, some with no advance notice. Most, because of large backlogs or replacement contracts, were able to take the cuts in stride, laying off relatively few or no workers.

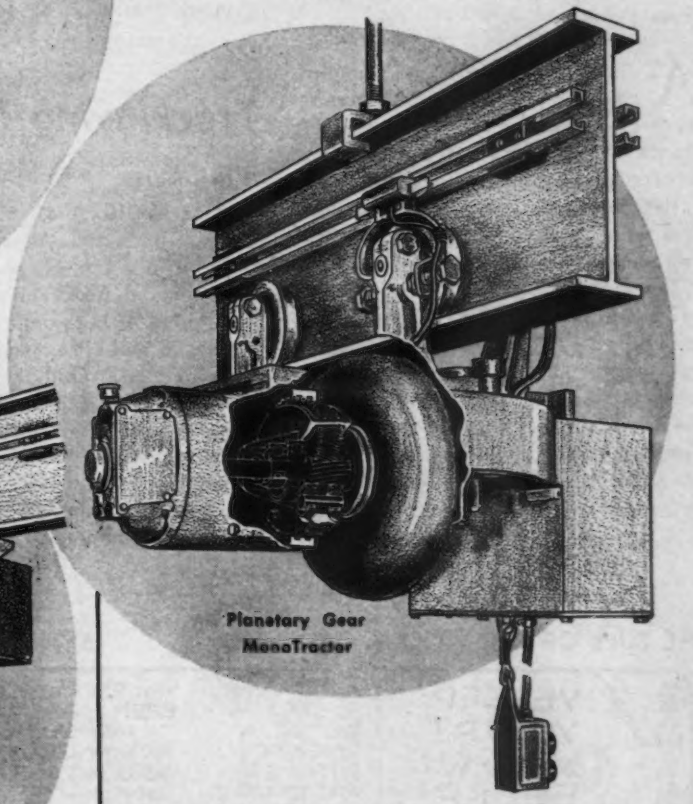
On this account, the report says that Buffalo has had little preparation for the problems it will have to face after X-Day.

"Altogether," the report says, "the predictions and plans of these companies are indecisive. They have to be. They are representative of the general uncertainty throughout the country. When first X-Day and V-Day (when Japan falls) come, the best laid reconversion plans are apt to give way

MOTORIZE
YOUR
OVERHEAD Handling
Get Increased Return From MONORAIL EQUIPMENT


Spur Gear MonoTractor


3-Ton Hoist and MonoTractor Unit


Planetary Gear MonoTractor

● Let an American MonoRail Engineer explain the advantages of motorized overhead handling equipment in your plant. Write today.

THE AMERICAN MONORAIL CO.
13103 ATHENS AVENUE CLEVELAND 7, OHIO

AMERICAN MonoTractors with pneumatic tires inflated against the bottom of track provide transportation for carriers, hoists, and cranes. Increased tractive contact of the tire against the flat rail furnishes greater draw-bar pull required to handle heavy loads up or down grades and around curves, under perfect control. Compact electrification, together with many exclusive control features of the American MonoTractor, permits the application of automatic equipment to handling problems in nearly every industry. Costs are reduced in direct proportion to the number of man-hours saved.

to the reflex action of the profit and loss account . . ."

Only about 20 per cent of the plants will have to do considerable retooling. However, some of the big employers are in this group. Retooling may take from six to nine months on the average, but some plants can continue partial production in the meantime.

Very few of the companies surveyed intend to expand their plant space. Twenty-two of 35 plants in a position to assess postwar needs reported that new equipment would be acquired. Two plants indicated definitely ambitious plans.

AT least six are interested in purchasing some of the government-owned equipment now in their plants if the terms are satisfactory. Others fear that terms will be too satisfactory and thus give competitors who might be able to reconvert more rapidly an unfair advantage.

The survey says that most companies report technological progress during the war, especially in metal working, improved alloys, cuttings tools, foundry and welding techniques and electronic devices. For example, one company making its prewar product has increased output per man-hour by 15 per cent.

At the same time, all but four companies take for granted that production costs will be above prewar levels, chiefly because of higher wage rates. Hardly any are prepared to make specific estimates.

Some guess that costs will rise even above the present level, because of reduced volume of production; some guess they will go down somewhat because of the elimination of overtime pay. Very few relate improved techniques and labor saving devices to estimate either their production costs or their probable employment.

The report declared that the most obvious candidates for unemployment are women and aircraft workers. Half of the companies intend to keep few or no women because of tendency to absenteeism and poor adaptability to the rigors of heavy industry.

A majority of Niagara frontier firms told the BLS experts that they plan to cushion the initial impact of the cutbacks by first eliminating their subcontractors. While the subcontractors, usually the smaller companies, will have to get along with such a cushion, it was pointed out they will be freed early for peacetime work.

o o o

Tracklaying Tractor Demand to Hold Up

Washington

• • • **WPB told the Tracklaying** Tractor Industry Advisory Committee at a recent meeting that the military demand for tracklaying tractors will remain high in 1945 even if European hostilities cease. Combined estimated and civilian demand next year, WPB officials said, exceeds the industry's total production capacity. It was stated that from present indications No. 1 class tractors, the heaviest type, and very few tractors in classes 2 and 5 will be available for general contractor use. In view of this situation, the committee recommended that L-53, controlling the distribution of tractors, be retained after V-E (victory in Europe) Day until such time as requirements and production are more evenly balanced.

The overall demand for repair parts will probably lessen in 1945, WPB officials said. However, the supply of certain critical parts will be tight at times. Committee members recommended that the order controlling repair parts, L-43-b, should be relaxed when conditions warrant such action, but that it should not be revoked immediately. The order now requires manufacturers to ship up to 65 per cent of their production of repair parts for military use, if the military places orders for them.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

YEEEEP! YAWP! YOWW! EEEEP!
HE'S TRYIN' TO START A RIOT AT A TIME WHEN HE'S MORE APT TO START A PARADE!
YEH, EVERYBODY'S BEEN EXPECTIN' TH' ARMISTICE ANY MINUTE FOR SO LONG THAT TH' SLIGHTEST COMMOTION MIGHT START A PARADE!
THE HUMORIST.
T. M. REG. U. S. PAT. OFF.
COPR. 1944 BY NEA SERVICE, INC.
J.R.WILLIAMS 9-24

Diamond Powder Grades Up for Trade Acceptance

Washington

• • • **"Recommended Commercial** Standard for Grading of Diamond Powder," adopted by a preliminary conference of manufacturers on June 27, is now being circulated by the National Bureau of Standards in its revised form to producers, distributors and users of diamond powders for written acceptance.

After defining terms as to grain size and the like, Recommended Standard TS-3802 gives a table of grade designations corresponding to maximum and minimum particle size and sieve analysis.

Copies of the proposed standard may be obtained from the Division of Trade Standards, National Bureau of Standards, Washington 25.

Typical Results Attained by Plunge Grinding Threads and Forms with a Crusher Dressed Wheel

SHOCK ABSORBER

This part consists of two steel tubes bonded together with rubber. The outer tube is SAE-1015 steel, .093" thick with a ½" threaded section on one end—threads 2⅛"—16N-3. These threads are plunge ground in a fraction of the time without the generation of the high heat inevitable with the single point wheel which caused tube and rubber to separate.

IMPELLER SPACER

This spacer, 2.223" long is ANS-6294 steel, case hardened to 81-84 Rockwell A, and has a .010" of stock removed from each side and bottom of the grooves. Plunge grinding these grooves with a multi-ribbed wheel is accomplished in one-sixth the time it takes to grind them with a single point wheel.

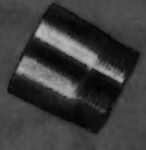
GOVERNOR PISTON

This piston, 1.591" long, is chrome-molybdenum steel 26-36 Rockwell C. Plunge grinding takes .005" from the outside of four shoulders leaving sharp corners. Production rate by plunge grinding is ten times as fast as it is by older methods.

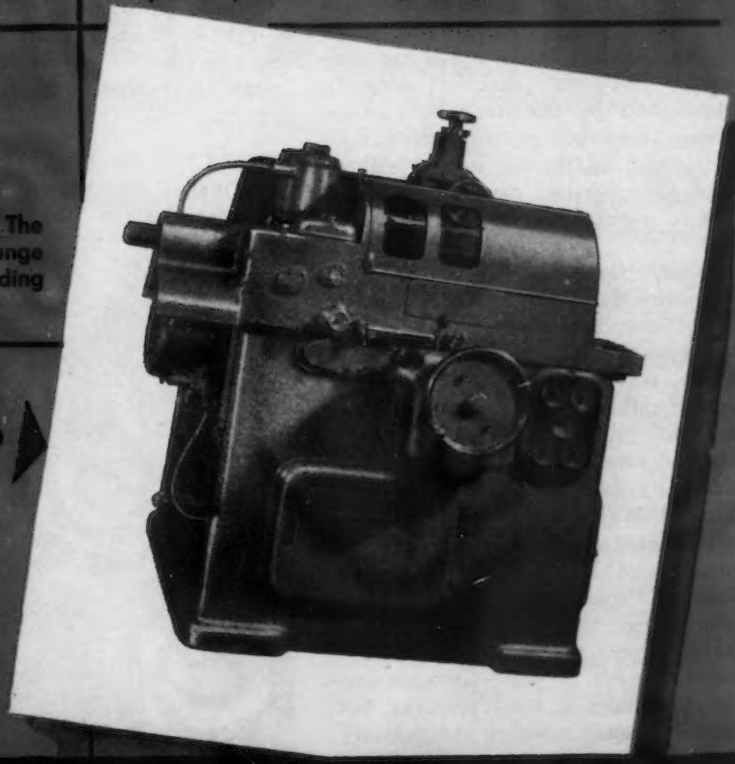
PROPELLER STUD

This stud is chrome-molybdenum steel 32-36 Rockwell C. The threaded section, 11/16" long (⅞"—20NF-3), is plunge ground in one-third the time required by conventional grinding.

SLEEVE



This sleeve is SAE-1015 steel 25-30 Rockwell C. The threaded section, ½" long (1⅜"—18N-3), is plunge ground in one-quarter the time required by grinding with a single point wheel.



All the parts shown here have been processed on the Sheffield Precision Thread and Form Grinder under normal operating conditions.

This machine, using a crusher dressed multi-ribbed wheel, plunge grinds single- or multi-start threads, eliminating thick first and last threads. It plunge grinds forms of almost any contour. It is also used to traverse grind single- or multi-start threads with a multi-ribbed wheel or it may be used with the conventional diamond dressed single point wheel.

Write for complete story on crusher roll wheel dressing and plunge grinding—Bulletin M-100-144.

THE SHEFFIELD CORPORATION

Dayton 1, Ohio, U.S.A.

MACHINE TOOLS • GAGES • MEASURING INSTRUMENTS • CONTRACT SERVICES

WEST COAST . . . OSGOOD MURDOCK

• VJ-Day is several years ahead, and until then the Pacific Coast is a crucial war area, warns navy as VE-Day dawns elsewhere . . . Attorney General Berge includes steel in his thrusts.

SAN FRANCISCO—Pacific naval and military operations and their prospective several years of war against Japan are being seriously impaired and dangerously threatened by the nation's wartime letdown and such general present concern with plans for peace celebration, reconversion, surplus materials, not to mention the presidential election.

While Governor Dewey traveled down the West Coast last week openly talking Republican politics, Assistant Attorney General Wendell Berge traveled up the West Coast openly talking anti-monopoly and the roll of freedom in our national economy and Democratic politics incidentally and covertly. Postmaster General Walker also traveled about talking only Democratic politics, both openly and covertly, and Florida's Senator Pepper completed his separate swing. All these official emissaries from the eastern seaboard were covetous in their attitude and complimentary in their remarks, yet none devoted himself to the primary present problem here—war with Japan and the West Coast's part therein.

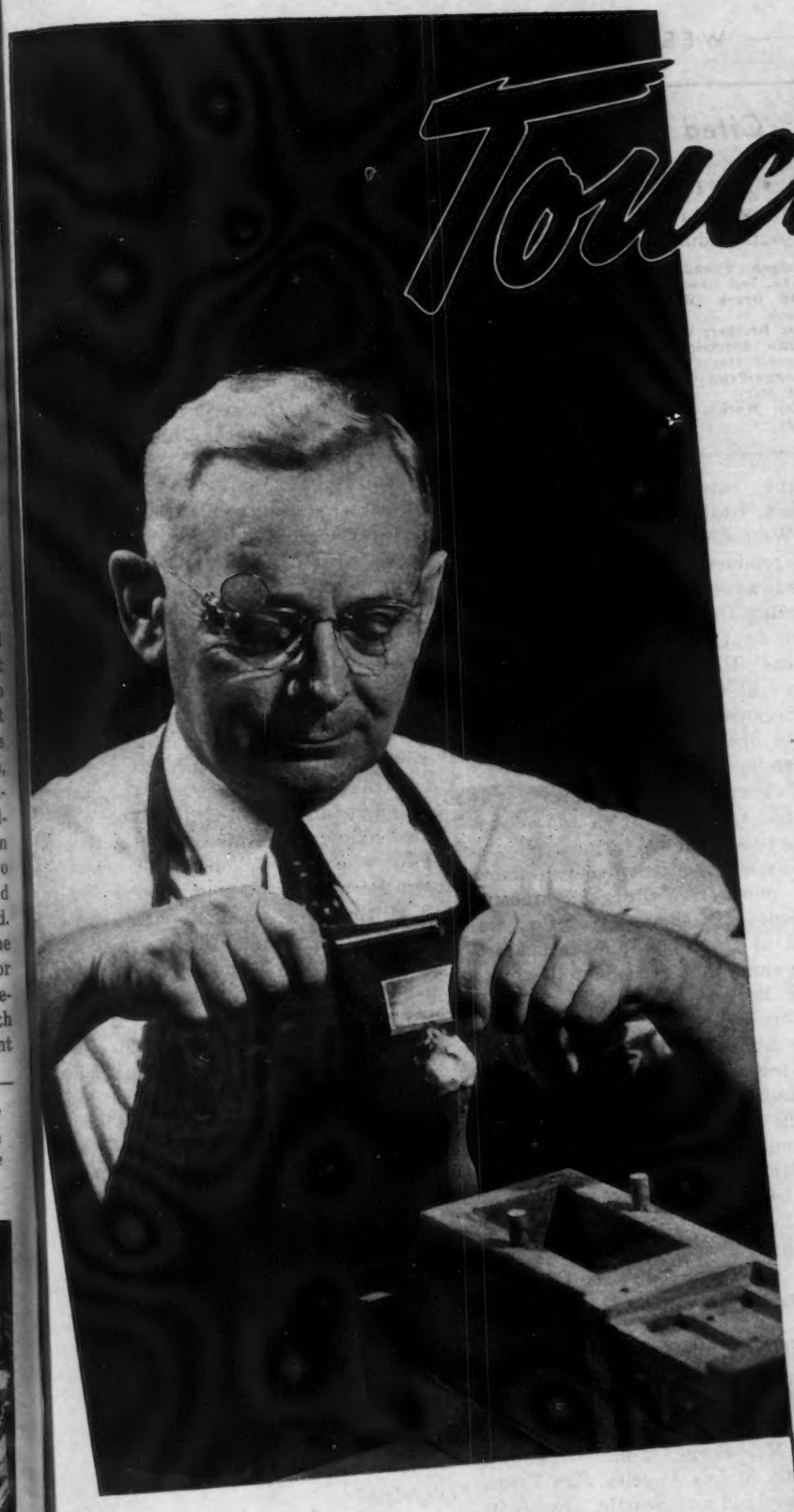
Of far more critical importance to the nation and concern to the West Coast was an unheralded meeting at San Francisco's Press Club sponsored by the Navy and attended by 100 newspaper editors, press association bureau chiefs, radio representatives, labor union executives, industrial editors and public relations men from California's war plants. Here the cards were placed on the table and serious problems of war with Japan and Pacific operations were frankly presented, perhaps for the first time to the civilian public right from the seahorse's mouth.

Navy and West Coast industrialists with war contracts are desperately worried. Workers are leaving war plants in droves, to return to the evernormal granaries of the Midwest or to their little former affairs elsewhere. There is a marked letdown in morale and production. Rear Admiral Mahlon S. Tisdale, commandant of the Mare Island Navy Yard, declared that his yard needs 8000 additional employees, mainly in skilled trades, by the end of this year. He pointed out that less than 10 per cent of the West Coast total productive effort, at a conservative estimate, has been devoted to the European battlefront. "Therefore it is obvious that we can in no way cease to function in our utmost until Japan has surrendered unconditionally."

It was pointed out that Navy and Army operations in the Pacific must be greatly accelerated, and will be, when emphasis on Europe is decreased. Problems of supply, repair, and reinforcement are prodigious. The entire West Coast, but especially those areas tributary to San Francisco Bay, Puget Sound, and San Diego and Los Angeles harbors, are part of the Navy's shore establishments in its all-out support of the Fleet.

"Shipbuilding will be held to its full capacity at least until the midsummer of 1945," declared the Admiral. Maintenance, overhaul, and repair of battle and merchant craft are even now choking and tying up docks, yards, and ways at every point along the West Coast. As operations intensify and supply lines lengthen, strain and pressure on the bases multiply. It is estimated that two million tons of shipping are constantly in San Francisco Bay being loaded, two million tons are en route empty, and another two million en route loaded. That is not enough. During all the Pacific operations and for a year or two thereafter the maintenance, repair, supply and conversion of both Navy fighting ships and merchant

PLIOFILM WRAPPED: *At Long Beach, Cal., motors to be used in the C-47 hospital cargo "Skytrains" arrive at the Douglas Aircraft plant wrapped in Pliofilm. The airtight Pliofilm envelope prevents the rusting of vital engine parts.*



Touch

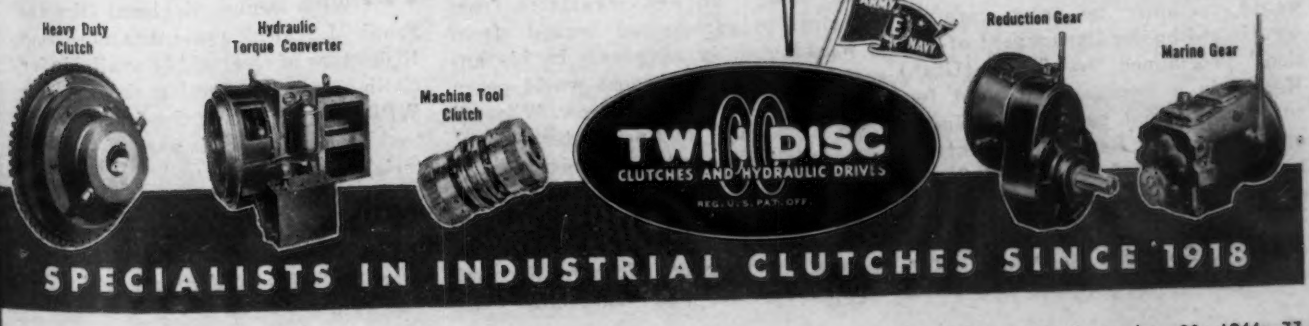
THAT TURNS STONE INTO TREASURE . . .

There's no hint of a beautifully brilliant, flawlessly cut gem in the rough stone that comes to the diamond cutter. Knowledge gained through the long, hard apprenticeship he began as a boy determines first how the stone must be cut. Then it takes his skill and cunning—products of years of development and practice—to give the jewel its value.

There's also a touch that adds extra value to units that link driving and driven parts of machines you build or buy. You get that extra value when you utilize the experience gained by the Twin Disc Clutch Company in over 26 years of designing and building power links for most industrial applications.

It's easy to recognize the benefits of using power links whose makers have—(a) the broadest experience in determining what kind of power link will do the job best; (b) thorough, continuously expanding knowledge of tools, materials and methods that make power links *better;* (c) strategically located factory branches and service stations everywhere. That's what you get in Twin Disc Clutches and Hydraulic Drives.

You might profit from one other thing you can get from Twin Disc. That's unbiased engineering recommendations and help. We make both friction clutches and hydraulic drives and will be pleased to give you the whole story on either type. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).



SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

supply and troop ships are expected to busy all West Coast ports operating at full capacity.

Under these circumstances, why the letdown? Labor leaders suggest that insufficient crowded housing, higher rents, difficulties of travel, shortage of gasoline, high cost of poorer food, and general inequalities in living are the reason. These factors are undoubtedly partly responsible.

HIGH wages are no longer an inducement, for most war workers can't buy in this area now, the things they have worked for. From their homes beyond the Rockies and especially recently from Washington, immigrants are disillusioned and diverted by a predominance of concern with reconversion, surpluses, European victories and old jobs back.

Those familiar with the organization and operation of the various government agencies so vitally concerned, War Manpower Commission, U. S. Employment Service, WPB, OPA, War Food Administration, Smaller War Plants Corp., etc., are convinced that the West Coast area has suffered severely by centralization of authority at Washington, and prevalent misunderstandings of West Coast overall conditions. There is little effective coordination among the several agencies on and for the West Coast. There are even separate regional setups between the Pacific Northwest and the Pacific Southwest, even though predominant wartime problems in the Pacific supply are common to the entire area.

When VE-Day dawns in Europe and the nation relaxes and celebrates, as it seems bound to do, West Coast supply problems and the Navy's Pacific military operations will suffer even more severely. VJ-Day is several years ahead, and until it comes the West Coast is and will continue to be a hard pressed, critical war area.

* * *

"ANY move by U. S. Steel Corp. to acquire the $200,000,000 basic steel industry at Geneva, Utah, would certainly be most carefully scrutinized by the Department of Justice," proclaimed the Provo (Utah) Herald in a 2-column, 10 point feature on its front page, purporting to quote Wendell Berge, assistant attorney general of the United States, as he was interviewed in San Francisco.

"U. S. Steel has shown no interest whatever in fighting for better freight rates that would enable Geneva, Utah, steel to be shipped to the West Coast in competition with steel produced in the East," he was quoted as continuing. "Westerners operating Geneva, on the other hand, would fight to get the rates down, whereas U. S. Steel might close Geneva at the first sign of a recession because it would be more profitable to operate at Pittsburgh, Gary or Birmingham."

Following this biased, provocative, ill-considered blast from the gladiator against monopolies, cartels, big business, and concentration of industrial power, Walther Mathesius, president of Geneva Steel Co., was quoted in the same publication and in the same size type as follows:

"Mr. Berge was either in error or misinformed regarding the U. S. Steel Corp.'s attitude toward lower freight rates for western industry, and in the assumption that U. S. Steel will close the plant at the slightest excuse. It sounds like a political speech to me. Mr. Berge shows he does not know what he is talking about. I think the record will prove that U. S. Steel has always advocated lower freight rates for the West from the very beginning."

WHILE filing anti-trust suits against 47 western railroads at Kansas City and similar suits against borax producers in California, Mr. Berge spoke often and frequently at Los Angeles, San Francisco, Portland and Seattle, always in the same vein and invariably from script prepared and issued from Washington in advance. In his anticipation of permanent world peace "in the spirit of Woodrow Wilson," he inveighed against international monopolies, secret governments, cartels, and concentration of industrial power. Optical goods, dyestuffs, chemicals, steel, copper, wool, sugar beets, the packing industry, and even lumber, fruits and vegetables were his horrid examples. "The seats of monopoly power are not on the West Coast," he declared. "You must free yourselves from absentee control. Branch plants can be closed at the will of the absentee owner."

He suggested plants and industrials "owned and managed by local people free from monopoly connections. . . . The real believers in free enterprise look to the West with high and exciting hope," he concluded.

Following the recent path and re-echoing the words of Chairman Maury Maverick of SWPC, and Senator Pat McCarran of Nevada, these were sentiments that many a provincial politician and many small operators on the West Coast loved to hear. They seemed to indicate again that decentralization of industry and the purchase of war plants by independent interests resident in remoter sections of the United States would be looked upon with sympathy and favor by principals in the present administration at Washington. "We must have a world in which the doors of opportunity will still be open to men like Henry Kaiser, Andrew Higgins and Eric Johnston," declared Mr. Berge.

All that now remains, getting down to cold, hard facts in the steel industry, is for some rugged, independent native son of the West Coast or honorable combination thereof (but no cartels, gentlemen)—to bid some $200,000,000 or reasonable facsimile thereof, for the said Geneva steel plant, and then either buy or influence these railroads to put the cheapest steel on the West Coast that any area anywhere enjoys. Then watch the smoke roll from the factory chimneys and the jobs that will be available for all these former aircraft, shipyard, and war workers who would like to live on the West Coast if someone will pay them more to do so.

Cited for Awards

• • • The following companies have been awarded the Army-Navy "E" for outstanding war production:

American Foundry Equipment Co., Mishawaka, Ind. (second star)
Bound Brook Oil-Less Bearing Co., Bound Brook, N. J. (third star)
Divine Brothers Co., Utica, N. Y. (third star)
McGraw Electric Co., Toastmaster Division. (second star)
Shenango-Penn Mold Co., Dover, Ohio. (second star)
Stanley Works, New Britain, Conn. (second star)

13,000 Tons of Steel For Civilian Goods Manufacture

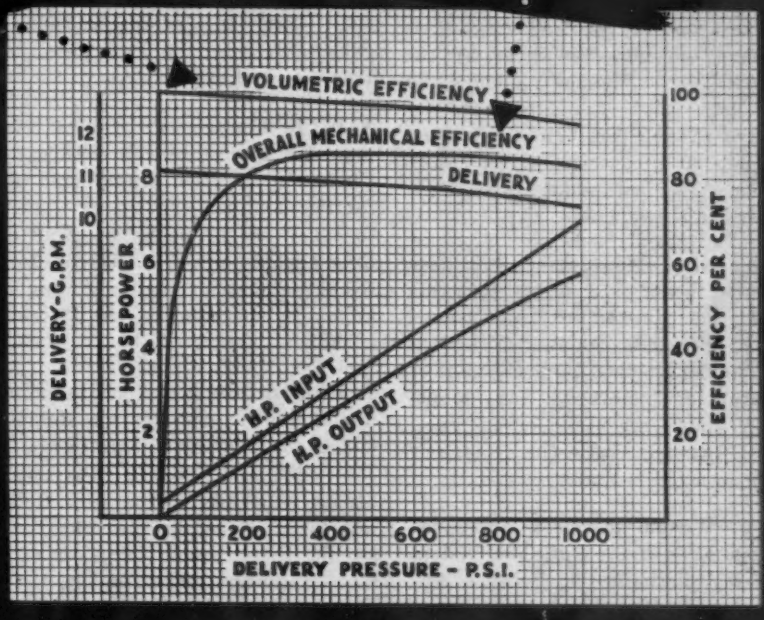
Cleevland

• • • WPB Deputy Regional Director Frank M. Aldridge said that more than 13,000 tons of steel will be available for civilian goods manufacture in this WPB district during the fourth quarter. The allotment is part of the materials bank setup under WPB spot authorization plan, to aid reconversion.

The 13,000 ton bank consists of about 10,800 tons of carbon and 2,700 tons of alloy steel.

HIGHER VOLUMETRIC EFFICIENCY...

HIGHER MECHANICAL EFFICIENCY...



Typical curves shown are for V-104-D pump at 1200 rpm; curves for other models are similar. Above curves are for oil having viscosity of 150 S.S.U. at 100° F., temperature of 120° F.

VICKERS
BALANCED Vane Type PUMPS

Representative of More than 5,000 Standardized Vickers Units for Every Hydraulic Power and Control Function

These performance curves merit careful consideration when selecting constant delivery pumps for oil hydraulic power and control systems. The overall mechanical efficiency is extremely high throughout the important working pressure range. Note that pump delivery and efficiency are not reduced appreciably as pressure is increased. These features, together with the 1000 psi continuous working pressure that is possible, effect an important reduction in pump size and cost. This higher working pressure also means a substantial saving in first cost and in space occupied by cylinders, valves, piping, tank, etc. for a given speed and power.

Other important advantages of Vickers Balanced Vane Type Pumps include: (1) Hydraulic Balance which cancels out bearing loads and means much longer pump life, (2) cartridge assembly contains all pumping parts that move and is important to the simplicity, easy inspection and minimum maintenance of these pumps, (3) compact, yet rugged, (4) automatic wear take-up, (5) temperature adaptability, etc. Ask for Bulletin 40-25a for all the facts about Vickers Balanced Vane Type Pumps.

Vickers Application Engineers will gladly discuss with you how Vickers Pumps and Vickers Hydromotive Controls can be used to advantage.

VICKERS *Incorporated*

1420 OAKMAN BLVD. • DETROIT 32, MICHIGAN

Application Engineering Offices: CHICAGO • CLEVELAND • DETROIT • LOS ANGELES
NEWARK • PHILADELPHIA • ROCKFORD • TULSA • WORCESTER

PERSONALS

• **Henry T. Platz,** who for the past 20 years has been associated with the Briggs Mfg. Co., as chief engineer of the Tool Fixture and Welding Division and executive engineer of the Aircraft Turret Division from 1941 to 1943, has been appointed district manager of the Sciaky Bros., Chicago, for Ohio and eastern and northern Indiana. He will make his headquarters in Cleveland.

• **Maynard G. Montgomery** has been appointed head of a broad program within the Carnegie-Illinois Steel Corp.'s Industrial Relations Department, looking to the re-employment of its returning veterans. Mr. Montgomery most recently served as a general foreman at the Gary plant of the corporation.

• **R. C. Wilson** has been appointed sales manager of the Buffalo Division, Farrel-Birmingham Co., Inc., Ansonia, Conn. Mr. Wilson joined the Farrel-Birmingham Co. in 1934 as sales engineer and in 1942 became assistant to the sales manager.

• **J. S. Allen** has been appointed director of sales of the newly organized Special Products Division, Bowser, Inc., Fort Wayne, Ind. Mr. Allen retains his vice-presidency with the Fostoria Screw Co., a wholly owned subsidiary of Bowser, in addition to this new assignment. **J. C. Allen, Jr.,** has been appointed general sales manager of the Fostoria Screw Co., Fostoria and Tiffin, Ohio.

LEON C. REED, assistant manager, Railroad Sales Division, Inland Steel Co.

• **William C. Sleeman,** works manager of the Pullman-Standard Car Mfg. Co.'s Bessemer, Ala., plant, has been appointed assistant manager of all the company's freight plants. He also remains as Bessemer works manager, the position he has held since 1929. Prior to that he had been chief car engineer for the Tennessee Coal & Iron Co. in Fairfield, Ala.

• **W. R. Persons,** Pittsburgh district manager of the Lincoln Electric Co., Cleveland, has been transferred to the factory and main office at Cleveland to carry out a special postwar planning assignment. **J. S. Roscoe,** former Syracuse district manager, has been appointed manager of the Pittsburgh office.

• **John R. Collette** has been made manager of a new Heating Boiler Division, to be operated as a part of the Titusville, Pa., Boiler Division of Struthers Wells Corp. Mr. Collette was for 23 years vice-president of the Pacific Steel Boiler Division of the U. S. Radiator Corp., Detroit.

• **John Hancock,** formerly treasurer of International Detrola Corp., Detroit, has been named general manager of the company's machinery plants in Elkhart and Indianapolis. **R. J. Nixon,** formerly assistant treasurer, has succeeded Mr. Hancock as treasurer.

• **Harry F. Clarke,** formerly director of spring mill products, has been appointed superintendent of the spring mill and rail bond department at the Worcester South Works, American Steel & Wire Co. At the same time, **Robert D. Knight** has relinquished his post to Mr. Clarke and has assumed Mr. Clarke's former duties. This exchange of positions has been made to round out the over-all experience of the company's technical and operating personnel.

• **Leon C. Reed** has been appointed assistant manager, Railroad Sales Division, and **Kenneth J. Burns,** Chicago district sales manager of the Inland Steel Co., Chicago. Mr. Reed will be in charge of sales to manufacturers of railroad equipment, serving also as a general assistant to W. J. Hammond, vice-president in charge of railroad sales. Mr. Reed has been associated with Inland Steel since 1909, starting in the order department and subsequently serving in various sales capacities until he was made Chicago district sales manager in 1936. Mr. Burns came to Inland in 1939 and since 1942 has been assistant to the manager of the Plate and Shape Sales Division in Chicago.

• **Joseph N. Moorhead** has been appointed works manager of the Buffalo foundry of the American Magnesium Corp., subsidiary of the Aluminum Co. of America. He succeeds **C. H. DeLamater,** who has been named manager of the Fairfield Works in Connecticut, replacing the late H. J. Deutsch. Mr. Moorhead was manager of the Aluminum Co.'s sand foundry in Buffalo from 1927 to 1932, and from 1934 had been manager of the company's Cleveland sand foundry.

• **Roy T. Hurley** has been elected vice-president of Bendix Aviation Corp. and has been assigned to handle special problems for the corporation in reconversion and the immediate postwar period. Mr. Hurley was loaned by Bendix to the War Department for the period of one and a half years, during which he served as production adviser to Major-General Levin H. Campbell, Jr., chief of ordnance.

• **Lucien W. Moore,** has been appointed manager of the Valve and Fitting Sales Department, Crane Co., Chicago. **Thomas J. Hanlon** succeeds Mr. Moore as purchasing agent.

KENNETH J. BURNS, Chicago district sales manager, Inland Steel Co.

• **A. G. Chaffer** has been appointed sales manager of General Electric's household refrigerator division with headquarters in Bridgeport, Conn. Prior to his new appointment he was assistant manager of General Electric's South Lowell Works.

• **William B. Mercer** has rejoined Robins Conveyors, Inc., Passaic, N. J., in their Boston sales office. Since 1942, he has been with the WPB Material Handling Division.

• **Hugo W. Liebert** has been made general works manager of the tractor plants, a newly created position, Allis-Chalmers Mfg. Co., Milwaukee, and **Fred S. Mackey** has become general works manager of the general machinery plants. Mr. Liebert who came to Allis-Chalmers in 1903 had advanced through various supervisory capacities in the manufacturing division becoming works manager of the tractor plants in 1942. Mr. Mackey who came to Allis-Chalmers in 1923, was works manager of the company's new supercharger plants at the time of his new appointment.

JAMES A. QUAID, Philadelphia district manager, The Pressed Steel Co.

• **James A. Quaid** has been appointed Philadelphia district manager, The Pressed Steel Co., Wilkes-Barre, Pa. Mr. Quaid was formerly sales engineer, Allegheny Ludlum Steel Corp., Philadelphia.

• **James L. Dunn**, assistant plant manager of the Bridgeport plant of Jenkins Bros., has been elected vice-president in charge of industrial relations. Mr. Dunn has been associated with Jenkins Bros. since 1913.

• **William E. Custar**, who joined the Lamson & Sessions Co. in 1936 as a scale clerk in the Cleveland factory, has been promoted to assistant manager of the Aircraft Division.

• **P. K. Poulton** has resigned from Talon, Inc., to become president and general manager of Una Welding, Inc., East Cleveland.

• **C. W. Schemm** has joined the Ajax Electric Co., Philadelphia, as sales engineer in northern California with headquarters in San Francisco. For a number of years he was industrial heating specialist of the General Electric Co. in the St. Louis area.

• **Thomas Boyd** has been appointed assistant superintendent of labor relations for the Great Lakes, Michigan and Blast Furnace Divisions of Great Lakes Steel Corp., Detroit.

• **Gordon Lefebvre**, president of the Cooper-Bessemer Corp., Mt. Vernon, Ohio and Grove City, Pa., has been elected to the executive committee of the Machinery & Allied Products Institute.

• **Kenneth N. Nichols** has been appointed chief engineer in charge of production of Craft Mfg. Co., Chicago, fabricators of stainless steel equipment. He succeeds A. A. Vanis.

• **L. D. Stull**, formerly with the Frigidaire Division, has been appointed western sales manager for Apex Electrical Mfg. Co., Cleveland, with offices in San Francisco.

J. M. STAPLETON, assistant division superintendent of blast furnaces, South Works, Carnegie-Illinois Steel Corp.

• **J. M. Stapleton**, former superintendent of blast furnaces for Geneva Steel Co., Geneva, Utah, has been promoted to assistant division superintendent of blast furnaces at the South Works of Carnegie-Illinois Steel Corp., returning to the plant at which he worked for 22 years prior to joining Geneva last October. He succeeds the late R. D. Beck. **J. S. McMahon**, formerly assistant blast furnace superintendent at the Warren, Ohio, plant of Republic Steel Corp., succeeds Mr. Stapleton at Geneva. Before joining Republic he had been associated with the National Tube Co.

• **Walter A. Furst** has been appointed district representative in the Pittsburgh area for the Storage Battery Division of Philco Corp., Trenton, N. J.

OBITUARY...

• **I. I. Shonberg**, 62, widely known throughout the metal industry for 40 years, due to his activity in the fabrication of lead and tin products, died September 14. He was founder of Standard Rolling Mills, Inc., and later of Alpha Metals, Inc., Brooklyn, N. Y.

• **John R. H. Neal**, 64, president and one of the founders of Root, Neal & Co., dealers in mill and factory supplies, died Sept. 12 in Buffalo, N. Y.

• **John H. Meyer**, 64, treasurer of the Schnaible Foundry & Brass Works Co., Cincinnati, died suddenly in Chicago, September 16, while on a business trip.

• **Albert L. Marsh**, president of Hoskins Mfg. Co., Detroit, died September 17, at the age of 67. Mr. Marsh was the discoverer of an alloy important to the development of electrical heat-treating devices. In 1936 the Franklin Institute at Philadelphia presented to Mr. Marsh the Franklin Medal "for significant and timely contributions to the science of automotive engineering." He was awarded the Sauveur Prize for outstanding metallurgical achievement by the American Metals Congress in 1941.

• **Sigurd E. Anderson**, president of the New Monarch Machine & Stamping Co., Des Moines, Iowa, died September 13 at his home in Des Moines. Mr. Anderson founded his company in 1911.

• **James H. Rand, Sr.**, 85, died Sept. 15 at his home at North Falmouth, Mass. A pioneer in the field of efficient business filing methods, in 1890 he founded the Rand Ledger Co., which subsequently grew into Remington Rand, Inc.

• **Earle W. Sinclair**, president of the Sinclair Refining Co., and chairman of the executive committee of the Sinclair Oil Corp. died suddenly Sept. 21. He was 70 years old. Mr. Sinclair had been actively associated with the vast Sinclair oil interests since 1921.

• **John Brouwer**, superintendent of Gallmeyer & Livingston Co., Grand Rapids, Mich., since its organization in 1923, died suddenly September 10. He was 60 years old.

Fatigue Cracks . . .

BY A. H. DIX

Russian Eyebrows Move North

• • • Our Charley Post, who sees to it that you are in on everything of importance that happens in the Chicago area, ran into a visiting Russian metallurgist the other day at a plant in northern Indiana. When they were introduced the Russian said, "THE IRON AGE. Hm. What is the purpose of your publication—advertising?"

Charley was put in the position of the Englishman who, after ten years of quiet married life, returned home from work one evening to find his wife charming snakes. He said, "I didn't know you were a snake charmer. Why didn't you tell me?" She said, "You never arsked me." He said, "I never thought of it."

The staff is so busy digging up news that sometimes they let whole days go by without giving a thought to our social significance. Here, obviously, is a situation that should be corrected. Your favorite family journal's G.H.Q. should get out a directive. We could easily whip up something soggy on "The mission of THE IRON AGE is to acquaint plants making metals and metal products with new developments . . . and to provide a medium for advertising. . . ."

But things like that make even us yawn. So maybe we had just better come clean and tell the staff to tell the next Russian or Hoosier, "Our purpose is to do good and make money." When we stop doing the former we will no longer be able to do the latter.

Anaptronym

Willys-Overland's sales director dealt aptronymics a body blow when he took up selling instead of gear design. His name is H. G. Clash.

Aptronym

. . . F. R. Dearie is a Detroit sugar broker.

—*W. F. S.*

Sharp Rise, Slow Fall

. . . We note from a recent advertisement that nitriding time can be cut 200 per cent if a certain process is used. This brings the required time to less than zero. This brave new world!

—*Ernest O. Banks, Barberton, O.*

If you triple production you can brag that you upped it 200 per cent, but if you find a way to do in one hour what formerly took ten hours, you can only say that you have reduced the time 90 per cent. This is obviously a flaw in the mathematical system, and while we sympathize with our advertiser, there is nothing we can do about it.

Button Button

Mr. Banks also inquires:

Why not publish your editorial address somewhere in the f.f.j., say the title page?

You would think that publications would wear their addresses boldly on their persons and with pride, as a newly minted 2nd lt. wears his bars. But instead you find that usually the address is as carefully concealed as insanity in the family. It is there, but in the average case you can't find it in less than five minutes.

Ours is just where Mr. Banks thinks it ought to be—on the title page, and in a good position, too—left hand column, one inch from the top. But apparently it isn't prominent enough, so will the brass hats please do something.

Guess-Who Signatures

• • • Which reminds us to mention that our No. 1 brass hat, John H. Van Deventer, our president and editorial director, is now in England. He was invited over by the British government and is going to look around at plants and so on.

As our nation and England will probably have to work together more closely than ever, even the smallest pebble in our mutual path should be removed. We hope, therefore, that our chief will find an opportunity to mention a grain of sand that chafes us. It is the English custom of signing letters illegibly and not typing the signer's name on the letter.

The recipient's annoyance is not allayed by the line oftentimes on the bottom of the letterhead, "*Please address all letters to the firm.*" He spends minutes trying to decipher the signature, studying it this way and that. He fears that a reply to the firm will not reach the person for whom it is intended. Subconsciously he damns the English as a backward race, thus introducing a blue note into the duet we shall have to continue singing with our ally. Something should be done.

Liquid Syllables

• • • If the boss has any spare time we hope he will look into another little matter for us. We have always envied the English the mellowness and music of their addresses. Take any at random and you find it outdoes the finest work of the most poetic Westchester real estate developer, and seemingly without effort.

As an example we cite the address of the Mond-Nickel Co., Ltd.'s librarian. It used to appear on our subscription list as "*Miss E. W. Parker, Brackenbury, The Glade, Kingswood, Surrey,*" which to our ear is as caressing as a Crosby lullaby. An address change came through recently, and you would have laid odds that it would be for the worse, but this is what came up, "*Miss E. W. Parker, Montrose, Stanley Road, Battledown Cheltenham, Gloucestershire,*" which miraculously is even better than the first.

We would like to know how it is done.

Surgical Plug

• • • Our bread and butter depend upon the willingness of people to absorb profitable information via the printed word. Therefore, our feeling toward those who say "*I am too busy to read*" is, to air one of our two French phrases, pas chaud—meaning not warm.

To justify our feeling, which is admittedly fired by self-interest, we have built up the conviction that people always have time to do the things they want to do, and can convince themselves that they are too busy to do the things they don't want to do. As reading for profit calls for mental effort and self-discipline, an expert self-convincer can convince himself, if he puts his mind to it, that he is even too busy to read his professional journal.

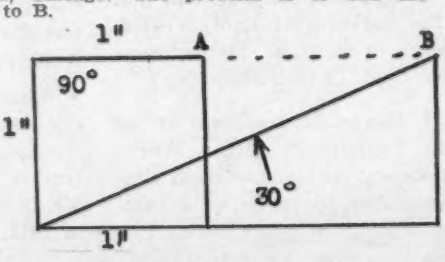
Of course, in time these people come to a bad end, and we hope that before it is too late, some of them will see what Dr. John Frederick Erdmann, the famous surgeon, has to say on the subject in the current issue of *Coronet*. He says, bless him:

When a surgeon gets too busy to keep up with developments by reading his professional journals, he soon ceases to be a busy surgeon.

Puzzles

• • • As you figured out mentally in less than 15 seconds, last week's spender started with 54 pieces.

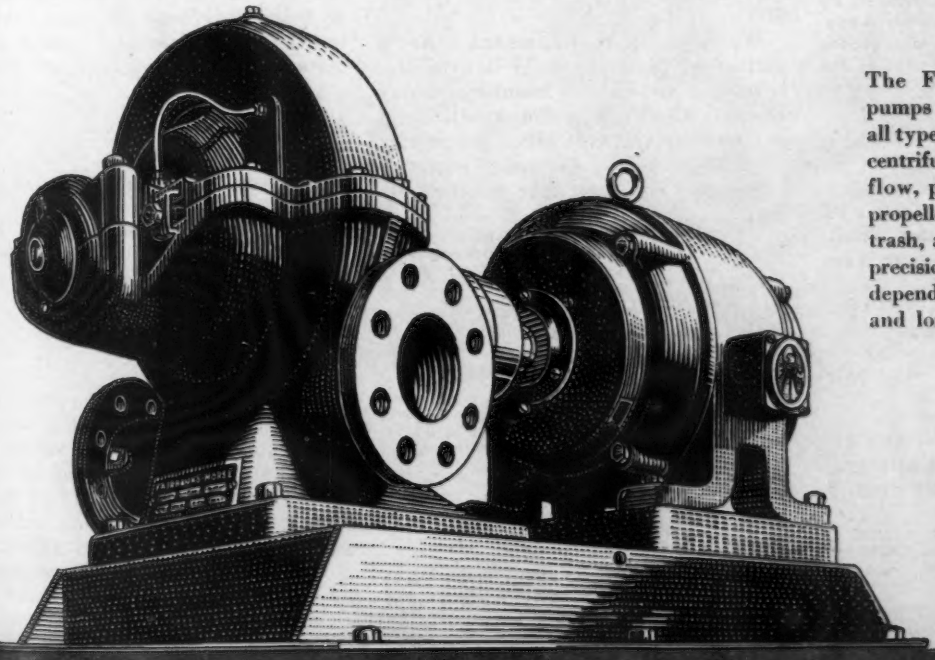
Don Ashford, who is an inspector of naval material, says a friend of his gave him the following problem, said to have been clipped from here. He wants the answer, but the problem is new to us, so if any of the master minds oblige, we will send the solutions to Mr. Ashford at 419 W. 62nd St., Chicago. The problem is to find the distance from A to B.



A name worth remembering!

FAIRBANKS-MORSE

After the war, the name Fairbanks-Morse will continue to mark performance-proved products only, as it has for 114 years. No race to get civilian products onto the market early will tempt us to break this pledge.



The Fairbanks-Morse line of pumps is complete and includes all types — centrifugal, split-case centrifugal, built-together, angle-flow, power, rotary, turbine, propeller, paper stock, sewage, trash, and many others. All are precision built to give efficient, dependable, low-cost operation and longer trouble-free service.

BUY MORE WAR BONDS

DIESEL LOCOMOTIVES • DIESEL ENGINES • GENERATORS • MOTORS • SCALES • PUMPS • STOKERS • RAILROAD AND FARM EQUIPMENT

FAIRBANKS, MORSE & CO., CHICAGO 5, ILLINOIS

Dear Editor:

PLATED CUTTING TOOLS

Sir:

We would appreciate a copy of "Tool Life Increased by Improved Chromium Plating Process," by Thomas E. Lloyd, in your Dec. 10, 1942, issue.

C. W. LEGUILLON, Mgr.
Machine and Process Development Dept.
B. F. Goodrich Co.,
Akron, Ohio

THREADING DIE CASTINGS

Sir:

Do you have any information on how to machine and cut threads on aluminum die castings? We find this material very abrasive and are looking for information regarding type of tool, clearance, angles on tool, type of lubricant, etc.

A. R. HAMILTON, Manager
Mellaphone Corp.,
Rochester 2, N. Y.

● Write to the Aluminum Co. of America, Gulf Building, Pittsburgh, for the latest edition of its illustrated bulletin, "Machining Alcoa Aluminum and its Alloys." This excellent treatise gives data on tool angles, coolants, speeds and feeds.—Ed.

CHROMODIZING ALUMINUM

Sir:

Mentioned in your Aug. 17 issue, page 73, is the chromodizing process for aluminum. I would like more information on the process and would like to know whom to contact.

D. C. WILLIAMS, Metallurgist
Acme Machine Products,
Muncie, Ind.

● Chromodizing, a process for giving aluminum and aluminum alloys a protective, corrosion resistant surface, is practiced by the four major West Coast aircraft manufacturers. We are sending you a sequence of operations, which gives the names of the makers of the cleaning materials required.—Ed.

FURNACE GUIDE

Sir:

Will you please send me a copy of the article "Guide To Furnace Selection," by D. H. Gardner, in your Aug. 3 issue?

B. F. GALLE
American Die & Tool Co.,
Reading, Pa.

PRECISION CASTINGS

Sir:

I would like a clipping of the article, "Industrial Precision Castings," beginning on page 73 of your Sept. 7 issue.

THOMAS I. S. BOAK, Works Manager
Winchester Repeating Arms Co.,
New Haven 4, Conn.

HE LIKES US

Sir:

It might be of passing interest to you to know that our Mr. R. G. LeTourneau, who never wastes a minute of his average 88 hours per month in the air in his private plane, is one of your most ardent readers.

Recently, while flying with Mr. LeTourneau from our Vicksburg, Mississippi, plant to a speaking appearance he fulfilled in Evansville, Indiana, I counted not one but five copies of Iron Age in the cabin of his Lockheed-12. When he is not concocting new ideas and inventions, or preparing speeches, you can almost bet he'll have a copy of Iron Age in his hands up there.

Fellow executives and guests accompanying him on his air travels invariably discover he is an enthusiastic reader of and booster for Iron Age and its excellent content.

ROLAND NEFF
R. G. LeTourneau, Inc.,
Peoria, Ill.

GREAT EXPECTATIONS

Sir:

Congratulations on the excellent editorial "Great Expectations" in your Sept. 14 issue. A nice job and very well done.

J. Y. SCOTT, President
Van Norman Co.,
Springfield 7, Mass.

Sir:

It says a great deal in a few words. Have I your permission to reproduce it for distribution to our employees?

PETER E. RENTSCHLER, President
Hamilton Foundry & Machine Co.,
1551 Lincoln Ave.,
Hamilton, Ohio

Sir:

We were quite impressed. As a matter of fact we would like to distribute it among the members of our Kiwanis Club. Will you kindly send us 100 reprints with bill. The writer invariably turns to your editorial each time The Iron Age reaches his desk. . . .

H. O. BATES, Chairman,
Program Committee,
Kiwanis Club of Elizabeth
Acromark Co.,
9-13 Morrell St.,
Elizabeth 4, N. J.

Sir:

. . . very refreshing . . .

TOM SHRIVER, President
V. & O. Press Co.,
P. O. Box 728,
Hudson, N. Y.

Sir:

You have hit a current nail right square on the head. My wish would be for it to appear on the front page of every newspaper in the United States.

M. C. CARUTHERS,
New England Sales Manager
Vanadium-Alloys Steel Co.,
Springfield 1, Mass.

LABOR PRIORITY

Sir:

We read with a great deal of interest the article on page 144 of your June 15 issue, "War Industries Get Greatest Priority on Available Labor." We would like to have a few additional clippings.

C. C. LaVENE,
Engineering Div. Employment Mgr.
Douglas Aircraft Co., Inc.,
Santa Monica, Cal.

TIRE LIFE EXTENSION

Sir:

The article on extending life of industrial truck tires (page 61 of your Sept. 14 issue) is interesting. Could we secure reprints? If not, we would like your permission to make our own copies as we use a great many solid tires and in these days with synthetic rubber we are having our own trouble.

We use these on our auto floor chargers where the work is very severe and normally have no trouble, but since only synthetics are furnished the heat conditions disintegrate the tires very rapidly. This prevention angle which we have never seen before may offer a suggestion to our customers which may help.

EDGAR E. BROSIUS, President
Edgar E. Brosius Co.,
19th & P.R.R.,
Sharpsburg, P. O.,
Pittsburgh 15, Pa.

TUBE MAKING

Sir:

Sometime during the latter part of last year, you ran an article about a newly developed method of spinning tubing. If our memory is correct, it was developed by a mid-west concern and was different than standard methods in that a single die, drilled full of holes, was used. We are unable to locate the article and would appreciate any assistance you can give us.

T. R. HUGO, Plant Engineer
Foster Wheeler Corp.,
165 Broadway,
New York 6

● We do not recall this particular process but you may find reference to it in the series, "Tubes and Tube Making," by Dr. Bernard P. Planner, which appeared in our Dec. 16, 23, and 30, 1943, issues. A reprint is being mailed you.—Ed.

PROPELLER BRAKES

Sir:

The Aug. 17 "News Front" reads: "Giant bombers now being used do not require the long runways that were anticipated. Instead of wheel brakes, reversible pitch propellers have been developed which brake the plane rapidly, easily and safely."

Can you tell us where we can get additional information on this?

H. L. CREPS
Frank Foundries Corp.,
Moline, Ill.

● Write to the A.A.F. Materiel Command, 3636 Beverly Blvd., Los Angeles 54, Calif., or Materiel Command, Wright Field, Dayton, Ohio.—Ed.

T&W FORGINGS

usually cost less at the point of assembly

In forgings you can get metal quality in the exact degree required to meet a specific service condition. Such metal qualities as may be required, can be developed by forging and heat treating processes that are controllable at every stage of production. Heat treating forgings is a straight-forward production procedure that usually results in uniformity of physical properties in quantities of duplicate parts. T & W forging craftsmen, utilizing the most modern types of forging and heat treating equipment with a deft skill, achieve uniformity in a degree that results in reducing the time and expense of inspecting and checking forgings to a minimum. Matching forging skills with the proper equipment is the basic reason why T & W forgings *usually cost less at the point of assembly.* Ask a T & W Forging Engineer how T & W Forgings can help you win the coming battle of costs.

This forging is one-half of an assembly which is formed by welding two identical forgings together around the outer circumference. In this forging, proper grain flow is highly important to give it qualities to resist fatigue stresses.

TRANSUE & WILLIAMS

STEEL FORGING CORPORATION • ALLIANCE, O.

SALES OFFICES NEW YORK, PHILADELPHIA, CHICAGO, INDIANAPOLIS, DETROIT AND CLEVELAND

This Industrial Week . .

- **War Steel Output Unaffected by Postwar Plans**
- **New Billet Steel Allowed for Concrete Bars**
- **Scrap Prices Off, Composite Down 62½c. a Ton**

EVEN though the steel industry and its consumers are thinking more and more in terms of the probable production and consumption pattern in the period to follow Germany's defeat there was no evidence this week that such forward thinking and planning has affected the output of steel for urgent war needs.

Reports from major steel districts have indicated that although the order level is at a lower point than was the case during peak periods recently, order volume with many steel plants was still running neck and neck with steel shipments. It was apparent that this condition was not necessarily uniform among all steel companies. In some instances, the volume of new bookings in the past week were less than shipments, in other cases incoming orders were matching outgoing shipments and still further there were some examples where the volume of fresh orders was somewhat ahead of actual shipments.

On an overall basis new bookings were, in the aggregate, probably slightly less than total shipments. This condition has enabled some steel producers to make a very slight dent in their substantial backlogs. It is to be remembered, however, that many of the steel orders being received today reflect war programs which were set up some time ago and which are vulnerable as far as cancellations are concerned when Germany is defeated.

NO determination can be made of the current steel market either as to backlogs or real product demand until termination of the European war. Peace or not, however, it is apparent that a shift in product emphasis is taking place. Items normally associated with the construction field have been in particular demand during the past few days.

Sheet piling, long a comparatively dormant item has been requested in substantial quantities, presumably because of the shift in emphasis of the various war theaters. Current lists of new reinforcing projects are said to contain 50 per cent more tonnage than at any time in the past year and a half. Demand for concrete steel bars is especially heavy in relation to the current and projected fourth quarter directives.

A small sign that WPB recognizes an overall easier steel situation is testified to by the fact that it has, for the first time in the past few years, given permission for steel makers to use unconditioned rerolling billets for concrete bar manufacture. In previous periods the WPB had stipulated the utilization of rerolling rails or off grade and discarded steel billets.

AS a further note on the potential market for steel going into construction, it is noted that railroad bridge and shop construction projects are increasing in number. School and highway engineering projects for which bids are being taken now but which will be awarded in the future are expanding. Probably the most important factor in the shift in interest towards construction work is the contract situation of steel fabricators. Having been heavily engaged in the landing craft program which is now nearing completion, these steel processors are anxiously scanning new outlets for their manpower and equipment. Many fabricators may find their backlogs cut to the vanishing point within 90 days which in itself is a prime reason among this group for exploiting civilian or non-military projects.

While postwar business is being placed on a substantial scale, sales offices believe that much of this tonnage is being duplicated with several producers in the hope of gaining favorable deliveries when final brakes are released by WPB. Incidently, this situation is quite similar to that which prevailed prior to the imposition of the priority system. There is also a feeling that buyers are specifying tonnage now in order to get their foot in the postwar door of steel mill schedules and that actual quantities and types may be revised considerably before this material actually is processed.

THE so-called "confidential" report on the necessity for steel price increases in case steel wages were upped, prepared by the Research Division of the OPA seems to have become a doorstep foundling. OPA administrator, Chester Bowles, has disowned this report (which indicates that no steel price increase is necessary) by saying that it is "preliminary," that he has not examined it or discussed it with members of his staff and that OPA has drawn no "conclusions" whatever as to the ability of the steel industry to absorb a wage increase without a price increase.

Scrapwise, practically every district in the country echoes with boring regularity the fact that there is no market for iron and steel scrap. Again this week prices for all grades except cast scrap are down in Pittsburgh, Cleveland, New York, Buffalo, Boston and Philadelphia. The result of these declines has been to further reduce THE IRON AGE steel scrap composite 62½c. a ton to $17.00 a gross ton.

Due in the main to strikes in the Corrigan-McKinney and Gulfsteel plants of the Republic Steel Corp., the national steel ingot rate has declined this week to 94 per cent of capacity from last week's revised rate of 95.5 per cent. The districts affected are Cleveland, where operations have fallen 34 points to 63 per cent, and Birmingham, down six to 88 per cent. Other districts reporting declines in output are: Youngstown, down one to 93.5; Buffalo, down two to 102.5, and St. Louis, down 12 to 92.5. Pittsburgh operations have gained five points to 93 per cent, and Chicago output has increased a full point to 100 per cent. Steel production in Detroit has been upped one and a half points to 102.5 while Cincinnati at 109 and the Eastern district at 106 have gained six and 24 points respectively. Unchanged from last week are Philadelphia at 98.5; Wheeling at 91, and the West at 89.5 per cent.

• **ALL COAL MINES IN**—For the first time since mine supervisors began their unionization drive, Western Pennsylvania coal mines, including the government controlled pits, were all in production last week. However, the West Virginia coal fields have many mines out on strike, with loss of coal production mounting steadily.

• **FOG BOUND**—From Detroit: Inadvertently or purposely, and probably the latter, the ability of the auto industry to reconvert, its plans for doing so, and its progress, have all become about as obscure as a London fog and as uncertain as tomorrow's stock market. The reasons, of course, are largely competitive. The honeymoon of wartime cooperation between the auto industry producers still goes on. But subconscious civilian-goods selves of those companies, like any objects of Freudian psychoanalysis, are playing their customary baffling game. The old days are here again, and so are the old ways, and the old game of blowing smoke in curious eyes.

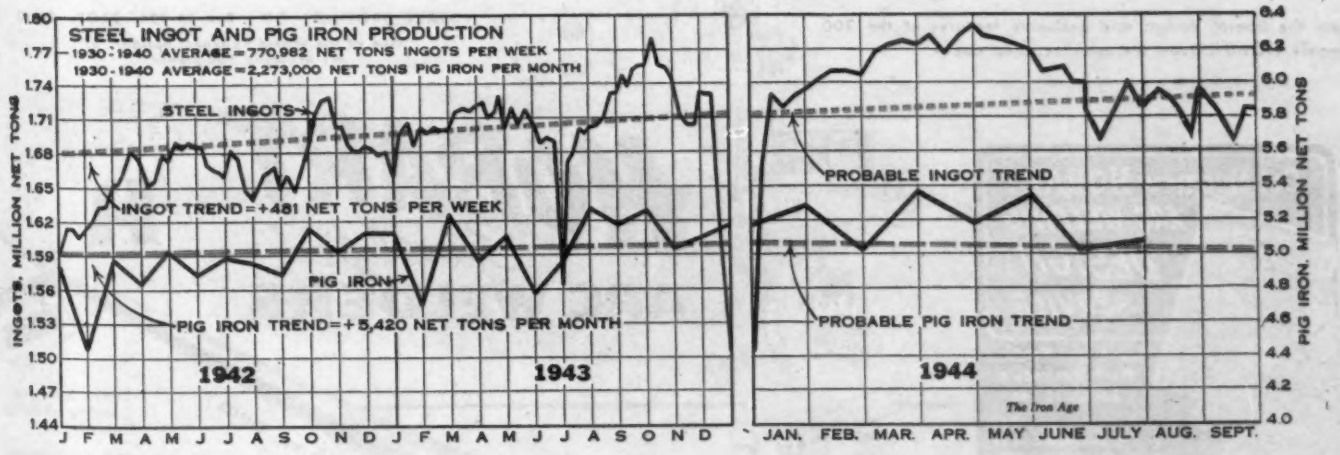
• **V-DAY WORK**—Voluntary pledges to remain on the job on V-day have been signed by all but 11 of the nearly 12,000 people doing war work at the Chicago plants of Pullman-Standard Car Mfg. Co. With labor cooperation, a survey was taken of employees in the company's aircraft, car works and Calument Harbor plant which are turning out war material primarily for use in the Pacific area.

• **PLATE SHIPMENTS**—For the first time since plate shipments began to assume about 20 per cent of total shipments, the participation of this product is now in a downward trend. In February, 1944, plate shipments accounted for 20.8 per cent of total steel shipments, while in July they accounted for 19.1 per cent, which approximated the 1942 average. Beecause plate directives will be cut in December and in the first quarter of 1945 for the Maritime Commission account, it is expected that there will be a more pronounced drop in the participation of plate shipments to total steel shipments by that time. In 1939 plate shipments constituted about eight per cent of total steel shipments.

• **SHEET SHIPMENTS**—In 1939 total sheet shipments represented 24.4 per cent of total steel shipments, but in 1943 they had declined to as low as 13.7 per cent of total steel shipments. In recent months, probably due to more space on the wide strip mills, as well as urgent war sheet orders, the participation of sheet shipments to total steel shipped has expanded slightly. In February, 1944, sheet shipments constituted 14.5 per cent of total steel shipments, while in July of this year, there participation was 15 per cent. It is believed that when plate tonnage declines it will first be taken off wide strip mills, thus enabling a greater production of hot rolled sheets. Hence the trend in sheet participation of total steel shipments will probably be accelerated upward.

• **AIRCRAFT PRODUCTION**—Gradual deceleration of P-38 Lightning production to permit shifting of manpower and materials to a new, still restricted fighter was announced recently by Lockheed Aircraft Corp. at Burbank, Calif. Lightning delivery schedules will be slightly reduced monthly for the next six months and stabilized thereafter. Production on new C-69 Constellation Army transports, B-17 bombers and the Navy's converted PV patrol bombers continues. New Army contracts for $356,000,000 worth of P-38's and B-17's have raised Lockheed's backlog to more than a million dollars, according to president Robert E. Gross.

• **WHO IS THE GOAT**—From Washington comes the news that OPA Administrator Chester Bowles said that the controversial steel report prepared by OPA's Research Division is "preliminary," that he had not examined it or discussed it with members of his staff, and that OPA has drawn no "cinclusions" whatever as to the ability of the steel industry to absorb a wage increase without a price increase. The report prepared under the direction of the head of OPA's Research Division, Richard K. Gilbert contends that there is no ground at the present for an overall increase in the price of steel. The report also says that with the imminence of contract cutbacks and the disappearance of the 48-hr. week, the steel industry could absorb the entire 17c. an hr. demanded by USWA without increasing steel prices. It could do this because of the savings resulting from the shift to 40 hr. and consequent downgrading of workers, the report said. Over last weekend, Mr. Bowles was angrily pursued by telephone calls of leading figures in the steel industry who requested him to issue a statement discrediting the report. Steel industry executives felt that the leakage of stories about the report which have appeared in hundreds of papers throughout the country in the past few weeks have prejudiced the case of the steel industry before WLB on the union demands.

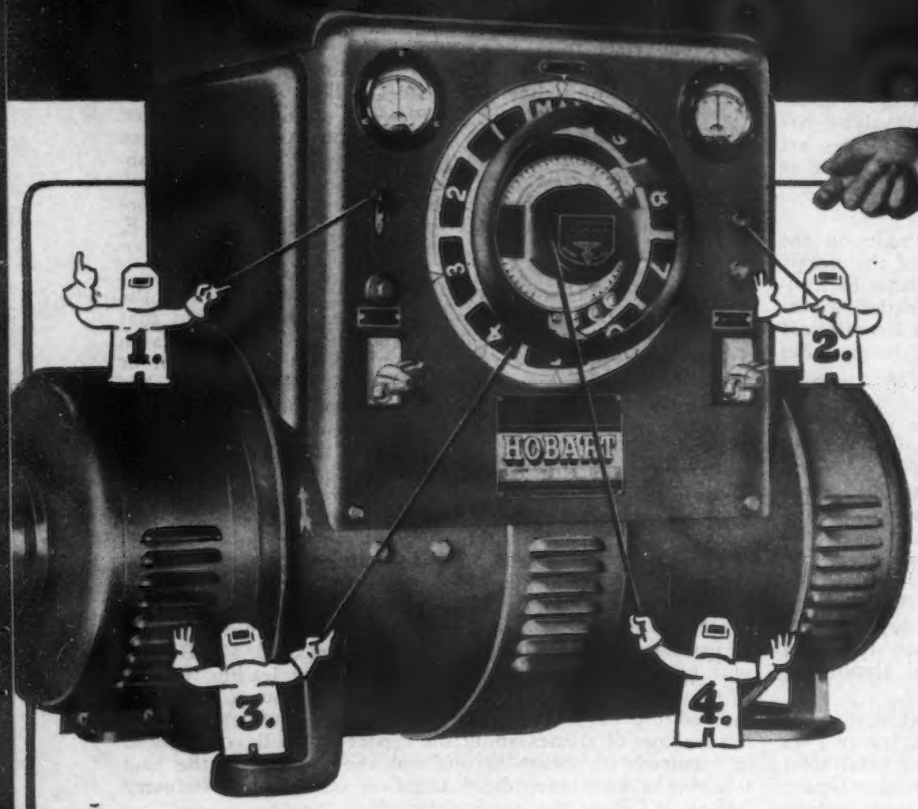


Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
September 19...	88.5*	99.5	94.5*	98.5	97.0*	104.5	91.0	94.0*	101.0	89.5	103.0	104.5	82.0	95.5*
September 26...	93.0	100.0	93.5	98.5	63.0	102.5	91.0	88.0	102.5	89.5	109.0	92.5	108.0	94.0

* Revised

Today's Welding — Calls for HOBART's Kind of Close Control

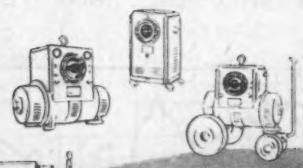


The strength and high quality of the weld is due to the close control of the arc for the various types of electrodes used. That's why these "Close Control" features were incorporated in Hobart's exclusive design. **1.** Convenient and simple switch for changing polarity to suit the different types of electrodes. **2.** Starting switch located inside turret top. Start, stop and reset buttons on outside of cabinet. Switch fully protected against overload, under-voltage and conditions of phase unbalance in power supply. **3.** Outer wheel and dial for selecting the desired welding range. It provides 10 steps which, with the 100 steps in the inner wheel, makes possible a wide range of 1,000 volt-ampere combinations. **4.** Inner wheel and dial for adjustment of heat and of relation between voltage and current. Removable for Remote Control.

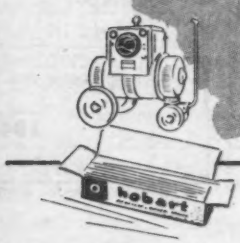
Note the liberal design and exclusive features of the 300 ampere Electric Driven Welder illustrated above.

HOBART BROTHERS CO., Box IA-934, TROY, OHIO

"One of the World's Largest Builders of Arc Welding Equipment."



HOBART "Simplified" ARC WELDERS



Investigate Hobart for your electrode requirements!

Issued Semi-Monthly - Worth Hundreds of Dollars To You

Initial editions are FREE, if you're interested in redesigning your product for Arc Welding, and will tell us on your letterhead about your plans and present equipment.

HOBART BROTHERS CO., BOX IA-934, TROY, OHIO

☐ Chetk here for Catalog showing Hobart line.

Please send me information on items checked without obligation.

☐ Gas Drive Welder.
☐ Electric Drive Welder.
☐ "Practical Design" Sheets
☐ Vest Pocket Welder's Guide.

Name_____

Position_____

City_____ **State**_____

BUY MORE BONDS to Speed VICTORY

Creation of Purchasing Power. Postwar Problem No. 1

o o o

By JOHN H. VAN DEVENTER

o o o

John H. Van Deventer

o o o

London (by cable)

• • • **American and British industry** face the same generic problems as to their postwar situations. It is increasingly evident that in both countries our ways of doing business will be governed by the efficiency or lack of it with which private enterprise tackles the problem of creating purchasing power through adequate employment. Employers here as at home fully realize the vital importance of this problem and are laying plans to meet it.

The problem here in the United Kingdom is perhaps more difficult than ours in America, for the reason that England has been hit harder and longer than we have and because from geographical reasons it is largely an importing and exporting nation. To offset this disadvantage, there is a more compact and efficient overall organization here than we have in the War Production Board and in our other emergency government agencies.

Another advantage is a rather complete organization of employers by industries with power to make definite decisions on problems, of which there are many that will arise requiring consideration and agreement between employers and employees. Later this can be more quickly handled by the Trade Association here which is unlike that in the United States in that it is not an outlaw body but is recognized by the government as representing its industries. Somewhere in England it has underground quarters as safe as the vaults of the Bank of England or more so.

I was privileged the other day to be the first press representative to visit the headquarters of the central office of Production Facilities Control here. The data concerning the status of every producing district in the United Kingdom are centralized and coordinated by a most ingenious system of charts and records. It is here that decisions have been and are being made with regard to plant expansion and new facilities and where the labor supply is controlled.

Labor in the United Kingdom both male and female is subject by law to government disposition in these subterranean offices. Current information is at hand regarding every producing concern in every production district relating to labor supply, machine utilization, housing, transportation, gas, electricity and degree of security. There are 63 of these regioned offices reporting.

Possibly because of having been at war longer, England has taken a more realistic attitude than has the U. S. with respect to the rehabilitation of is wounded soldiers. The Disabled Persons Employment Act passed by Parliament on March 1 of this year, provided mandatory quotas for employment of disabled veterans in such industries as are suitable for their employment. Naturally the lighter industries have the larger quotas. Special measures are provided for physical restoration and rehabilitation before placement.

The doodlebugs are still coming over in dribs and drabs but no one pays any attention to them. While they have had no military value whatever to the enemy, having damaged principally homes, schools and churches, collectively, they have effected a great deal of property damage, which introduces the problems of temporary shelter for the winter and somewhat later complete reconstruction. This reconstruction program contemplated in the poorer sections, will effect at least a considerable increase in municipal ownership and landlordship. In one heavily damaged district which normally had a 10 per cent public housing ownership, reconstruction activities will increase this threefold.

In spite of its trials and tribulations England still has its chin up and the average inhabitant seems less worried about dodging a doodlebug than the average American is about catching a subway train.

National Tube Company Re-acquires Tubular Alloy

Chicago

• • • **Re-acquisition by National Tube Co.** of buildings, property, and certain equipment operated by Tubular Alloy Steel Corp. in Gary, Ind., and designation of Tubular Alloy as an operating division of National Tube, effective Oct. 1, has been announced by the United States Steel Corp. subsidiaries.

Tubular Alloy was formed early in 1942 to produce seamless alloy tubing. Buildings and certain equipment owned by National Tube were utilized, along with new equipment owned by Defense Plant Corp., in establishing the new operation. Re-acquisition by National Tube of these properties does not affect the Defense Plant Corp. arrangement, it was stated. Leo J. Mason, vice president of Tubular Alloy, will be in charge of the Tubular Alloy Steel Division, and will retain his headquarters in Gary.

Anger Burns and Tempers Flare Over Controversial OPA Steel Report

• • By DONALD BROWNE • •

Washington

• • • OPA Administrator Chester Bowles said on Sept. 23 that the controversial steel report prepared by OPA's Research Division is "preliminary," that he has not examined it or discussed it with members of his staff, and that OPA has drawn no "conclusions" whatever as to the ability of the steel industry to absorb a wage increase without a price increase.

The report prepared under the direction of the head of OPA's Research Division, Richard K. Gilbert contends that there is no ground at the present for an overall increase in the price of steel. The report also says that with the imminence of contract cutbacks and the disappearance of the 48-hr. week, the steel industry could absorb the entire 17c an hr. demanded by USWA without increasing steel prices. It could do this because of the savings resulting from the shift to 40 hr. and consequent downgrading of workers, the report said.

Over last week-end, Mr. Bowles was angrily pursued by telephone calls of leading figures in the steel industry who requested him to issue a statement discrediting the report. Steel industry executives felt that the leakage of stories about the report which have appeared in hundreds of papers throughout the country in the past few weeks have prejudiced the case of the steel industry before WLB on the union demands.

Mr. Bowles, in his statement, declared that "OPA has no authority whatever over wages and of course takes no position in this matter." He went on to say that procedure established by executive order requires OPA to make a finding of fact with regard to the effect of a wage increase on prices for a particular industry and transmit them to the Office of Economic Stabilization.

Mr. Bowles denied that the "preliminary" report had been transmitted to Economic Stabilizer Vinson because such reports are not sent until WLB has finally acted on the wage increases.

Steel executives were not completely satisfied with Mr. Bowles' explanation because they felt that he should disown the report or vouch for its accuracy and explain why OPA had undertaken to prejudice the interests of the steel industry in the case before WLB. Some steel leaders, however, felt that Mr. Bowles' statement was fair and that he would say little more than he did under the circumstances because the damage was already done and that the reconversion price and wage argument was just the rationalization needed by the present president to totally scrap the Little Steel Formula.

One OPA Spokesman said that the reason Mr. Bowles did not discredit the Research Division's report was that the Research Division thought it was the one that should go to Mr. Vinson. Mr. Gilbert told THE IRON AGE, however, that this report will not necessarily be transmitted to Mr. Vinson.

The Research Division has never before prepared a wage price study in steel, except once in 1941 at the request of Leon Henderson when the same personnel was not involved. The report directly disagrees with a report based on present operating rates made earlier this year by OPA's steel division which concluded that the industry would be entitled to an across the board increase if WLB granted USWA more than 6c an hour increase.

There are a few who question that the report has lived up to its label of "confidential."

The report of WLB steel panel labor members, Stephen Levitsky and John Despol, released by the board on Sept. 15 on page 20 said:

"It is anticipated that a study should show that the breakeven point for the steel industry on the basis of its normal operations has been lowered considerably during the war period. The labor members are informed that the Office of Price Administration has made a detailed and comprehensive study of this very issue which completely substantiates that conclusion. We believe that it is of the utmost importance that this study be made available to NWLB.

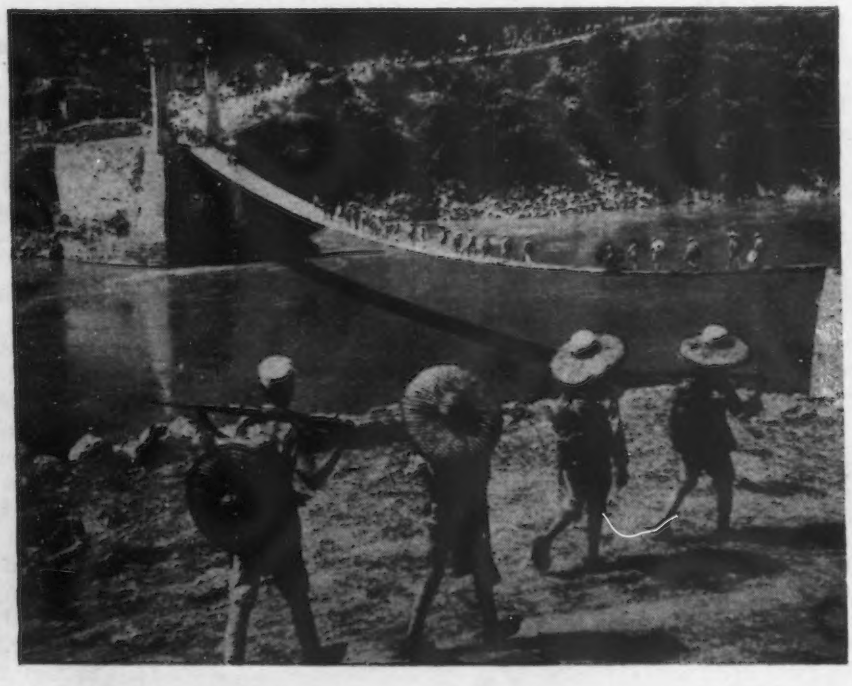
Public members of the panel, David L. Cole and Nathan P. Feinsinger, were able to say:

"There is the likelihood that production will decrease. There has been a considerable amount of talk about cutbacks and contract terminations. At present, the companies are on a 48-hr. week work schedule, although the actual hours of work average somewhat less. Premium overtime pay, of course, is given for all hours above 40 per week.

"In addition, under pressure to produce as much as possible, inefficient and older plants have been used.

"If production is reduced, initial

CHINA WARFARE: *By means of a temporary suspension bridge, these Chinese soldiers equipped with tools and weapons cross the treacherous Salween River en route to battle. All material used during the campaign has had to be carried or dropped from planes.*



unit costs of production will tend to decrease because: The unit labor cost will go down as premium overtime pay is eliminated; and presumably the marginal or less efficient plants will be shut down and the output per man hour will increase. A reduction in hours from 48 per week to 40 per week would reduce production by 16 2/3 per cent but labor costs would go down 25 per cent."

It was not evident that WLB steel panel industry members had seen the report, and it has been alleged that OPA refused to let them see it.

Some speculation is tying the leak on the steel report, to OPA's publicly announced intentions to hold prices at the general levels prevailing in 1942. Informed sources say that it is entirely possible that OPA's future price action can be predicted from how it handles new passenger car prices and that if they are held to 1942 levels it will be because OPA can promise the automobile industry that there will be no increase in steel costs. The factor of steel costs in auto production is small. It is estimated that the cost of steel in the average car is about $65 a ton.

In any event, the reports that the Administration is trying to hold prices down while letting wages go up fits the strategy of the leak, if it has Administration backing.

The report says the pattern for the whole steel industry can be predicted from its study which was on the United States Steel Corp. alone among steel companies, but included cement companies, shipbuilding and forging operations.

Women Workers Create Special Personnel Problem

Cincinnati

• • • **Because women workers** are more sensitive to criticism than men, a special personnel problem has been posed in feminine employment, according to George A. Seyler, vice-president of the National Metal Trades Association, and vice-president of the Lunkenheimer Co. On the other hand, Mr. Seyler states, "Women are industrious, painstaking, generally patient, highly loyal and are peculiarly suited for delicate processes requiring manual dexterity." Other characteristics noted are lack of desire for promotion and a desire to work with men foremen.

Steel Reconversion to Peacetime Production to Bring Special Problems

• • • By T. E. LLOYD • • •

Pittsburgh

• • • **Individual steel producers,** especially the leading companies, might find themselves in a peculiar position with regard to reconversion to civilian production after V-Day in Europe. Basically, steel reconversion problems are simple. On many products, reconversion consists only in a shift of customers—from Uncle Sam to private fabricator, Joe Zilch. In other instances, the problem goes back to steel making, where analyses are altered to meet the civilian customer's needs rather than the needs of the military. In still other instances, the finishing mills will require a changeover of equipment such as rolls to make the product needed by the civilian manufacturer. On the whole, reconversion to peacetime steel production will not be difficult.

Steel companies themselves are anxious to get back into production of steel for a civilian economy, where they will not be dogged and bedeviled by priorities, directives, and quotas. A better balance in production—a better product mix—will favor the steel producer, since civilian orders will be filled in the order received. There will not be last-minute directives that upset rolling schedules, and preferable products will be handled so as to maintain a desired product mix. Production of civilian orders scheduled by the companies themselves rather than by WPB decree will make for faster production, more economical production, and better trade relations between producer and consumer.

However, a wholesale changeover to civilian output by the entire industry is impossible after V-Day in Europe. A war is still to be won in the South Pacific, and, while the needs of this war will not be as great as the combined European and South Pacific wars, there are indications that they will still be rather high. Best estimates by WPB indicate that needs will be cut a maximum of 40 per cent.

Supplying the needs of this so-called secondary war is where the difficulties will arise with regard to the steel producers. The completely integrated mills, with well rounded out production facilities, may find themselves bearing the burden of the military needs for this war. They

HAZARDOUS CROSSING: *A medium tank crawls onto a pontoon bridge built by U. S. Engineers across the Meuse River near Leige, Belgium. An engineer guides the tank driver onto the treadways.*

will continue to be governed largely by priority government business. This will limit their civilian steel production, continue to hamper well balanced rolling schedules, and upset any plans for an optimum product distribution. Furthermore, these producers may find that their competition will get itself well set in the peacetime civilian steel markets before they can take peacetime orders.

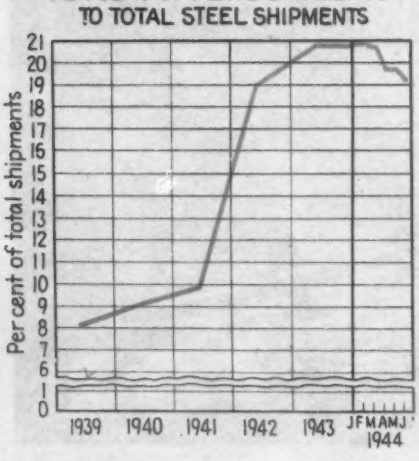
For example, the steel producer that has hot topping facilities will stand an excellent chance of continuing to carry government orders for forging and shell steels, while another small, non-integrated mill without such facilities can direct its production into civilian channels because the government won't have use for its steel output. Consequently, the large producer will be kept fairly busy on war orders while the non-integrated mill can establish its peacetime markets.

In the cold finished field, many smaller cold drawers whose auxiliary equipment, such as facilities for grinding, annealing, and tempering, is limited, may be able to direct their output into the normal cold drawn channels before those companies whose facilities are complete, since these producers will continue to carry war orders. These orders might well amount to considerable tonnage and naturally take precedence over civilian cold drawn orders.

To say that such conditions will upset smooth and rapid reconversion to peacetime production and upset peacetime markets is an understatement. Manufacturers and fabricators will place orders where they can get the best deliveries, and by the time that all mills are able to offer equally prompt deliveries, markets might be well established in some fields. Producers who were slow in getting back to civilian production because of their continued heavy war business may have some difficulty in getting old customers back into the fold and in establishing themselves with newcomers in the manufacturing field.

There are about seven companies whose production facilities almost guarantee that they will remain largely in war production. These are, of course, the seven leading steel producers; namely, U. S. Steel, Bethlehem, Republic, Jones & Laughlin, Youngstown, National, and Inland. A victory in Europe will undoubtedly ease the strain on all steel mills, but these seven will likely carry the bulk of the load in producing the steel that will defeat Japan. From indications now, the smaller, non-integrated producer will get the full benefit of peacetime reconversion long before the large, completely integrated producer. By being in this position, the small manufacturer can get the jump on the large producer, and establish peacetime markets.

PLATE PARTICIPATION: *Though the decline is not large, the per cent of plate shipments to total steel shipments has begun a downward trend. This trend is expected to become more pronounced in the fourth quarter when plate directives for Maritime will be slashed. Note the history of the trend in this chart.*



Foreman's Association Plans Drive for 100,000 Membership Goal

Detroit

• • • **Plans for an intensified** membership drive were outlined last week here in the third annual convention of the Foreman's Association of America, independent union of supervisory personnel.

Union president Robert H. Keys, who was reelected by acclamation, reported that membership now stands around 25,000, and that the aim is for 100,000 members during the coming year. To this end a regional organizing office, the first outside of Detroit, will be set up Oct. 1 at Chicago, and others will be installed later at Cleveland and Buffalo.

The convention's actions indicate that the steel industry will be an early target of the organizing drive, which until recently has been largely concentrated in the automobile industry and related plants. Among those named to the new 16-man board were delegates representing Great Lakes Steel Co., Detroit, the Bethlehem Lackawanna Works, the Cleveland mills of Republic Steel Co., the Gary works of Carnegie-Illinois, and the Chicago mills of Inland Steel Co. Local chapters are now functioning in all those mills, it was reported at the meetings, as well as Youngstown Sheet & Tube in Chicago and Allegheny-Ludlum Steel Co., in Dunkirk, N. Y.

In all, 84 chapters were represented at the convention. Since the qualifying date for attendance at the meeting went by more than three months ago, Keys pointed out, an additional 40 chapters have been organized.

The foremen took a militant stand on strike issues. The delegates hooted down a resolution to support the no-strike pledge given by other labor organizations, and went on to pass with one dissenting vote another resolution which promised to use the full strength of the union to oppose "reactionary employers."

Admittedly, the union has a large stake now pending in the forthcoming determination of the National War Labor Board as to whether supervisory personnel are entitled to bargaining rights. Confidence was expressed at the meeting that the WLB will take action of some sort to help their present position.

For the history of the FAA, see THE IRON AGE, *June 1, page 87. For details of the War Labor Board hearing on their case, see* THE IRON AGE, *Aug. 10, page 93.*

The convention was occasion for announcement of the second signed contract which the FAA has been able to negotiate, the first having been achieved at Ford Motor Co. earlier this year. The second one, with United Stove Co., Ypsilanti, Mich., covers only an estimated 30 foremen or so at this time, but probably will more than triple that number after reconversion.

The agreement recognizes the principle which the FAA maintains, that its members are not actually a part of management but only a transmission belt. Phraseology of one clause states that "inasmuch as the members are employed as supervisors by the management they may be called on to, and will, enforce the orders of the company."

WPB Gives X-Day Plans To Steel Industry Officials at Meeting

Washington

• • • **There will be no sharing** of the civilian steel business on a proportionate basis after X-Day, the WPB Steel Division may retain some scrap and ferro-alloy controls, and the WPB and OPA Industry Advisory groups may be merged, steel leaders were told in their regular monthly meeting on Sept. 21 with WPB officials.

Small business will be amply protected in securing their steel needs, industry members told Acting-Chairman J. A. Krug, who expressed concern that there be no discrimination between large and small customers. Mr. Krug told the Committee that WPB estimates that X-Day will free about 17,000,000 tons of finished capacity to be devoted to civilian output.

Operations Vice-Chairman H. G. Batcheller, who said there is no steel shortage, emphasized the need for castings for heavy trucks and said that steel distribution for war purposes after X-Day will be governed by a single military priority band.

Steel Division Director Norman W. Foy said that it has been decided that there will be no further inter-regional manpower recruitment for the mills, but that it is being arranged with WMC for steel companies to get higher local manpower priorities.

Benjamin Fairless, president of the United States Steel Corp., asked WPB officials if there would be any spreading of civilian business between companies to insure proportionate sharing by every company. Mr. Fairless pointed out that one company might find itself engaged in war production equal to 30 per cent of its capacity, whereas another company might find that 70 per cent of its business is still being furnished by the government.

Steel Division officials replied that it has been decided that all new civilian business should be on a strictly competitive basis and that civilian orders would not be allocated as is done with war orders. This policy, WPB officials have previously said, may endanger the steel supply of non-integrated mills, although industry members told WPB that small customers were just as important to them as large ones.

Mr. Foy declared that it has been tentatively decided to retain controls over ferrochromium, nickel, ferrocolumbium, alloy steel melt schedules and require that scrap continue to be segregated and used in alloy melts according to existing rules. However, all steel regulations may be scrapped, Mr. Foy said.

Eugene G. Grace, president of the Bethlehem Steel Co., said that it should be made certain that the merging of the industry advisory committees of OPA and WPB does not result in OPA reinstituting WPB-abolished controls over the industry.

The merging of all industry advisory committees is being undertaken by the two agencies to iron out production and pricing policies during reconversion. Frequently, WPB officials say, an OPA committee will say that it cannot make recommendations until the WPB committee has taken action and WPB committees have maintained the same thing.

Arthur H. Bunker, WPB Chief of Staff, said that all industry will be informed within the next few weeks of the extent of X-Day cutbacks. He pointed out that employers will be given the responsibility for informing employees of terminations when they think it proper. Industry members expressed approval of this policy. Labor unions are to be told on a regional basis.

Shells for Heavy Artillery Not Expected to Reach WPB Peaks

Pittsburgh

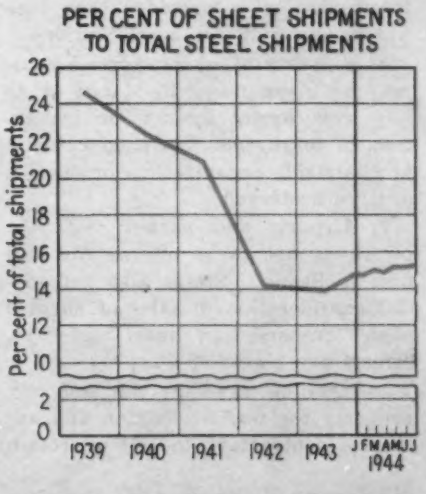
• • • **The heavy artillery** shell program is currently running well behind the original production schedule, as has been obvious for some time by the cutting back of the directives for shell steel. One large producer estimates that shell production at his plant is about two months behind schedule, and claims that he is in a better position than most other manufacturers. Furthermore, his current increase in production is not as high as anticipated and it is likely that instead of gaining he is losing ground.

While delays in getting shell producing equipment has been the chief cause of the delay in shell production, lack of skilled manpower has also been a contributing factor. However, with regard to the equipment picture, those in authority who set up the shell program certainly took an optimistic view on equipment production capacity, in the face of shortages that already existed in all types of hydraulic machinery and certain types of machine tools.

Currently, there are indications that the program will never hit its original goal. There is a feeling that it will follow the pattern of the bomb program, which, when a fairly high production rate was achieved, was frozen at lower than production goals. Furthermore, it is doubted by many observers that there is sufficient artillery now in existence or scheduled for manufacture to handle the shells in the quantities originally prescribed by WPB.

There is no question that production of shells will be stepped up from its present levels as quickly as possible, but somewhere long before it reaches its scheduled peak, production will be frozen. On top of this, a victory in Europe may ease the need for these shells and will permit diversion of both artillery and shells to the South Pacific theater. While this transfer is actually being made, producers will have an excellent chance to catch up a bit on production.

SLOW BUT SURE: *Slowly but surely the participation of sheet shipments to total steel shipments is edging upward. At present a heavy plate output is being taken care of on wide sheet mills but when the plate load declines, sheet shipments are expected to increase at a fast rate. Note the trend line.*



Surplus Property Bill to Be Greatly Revised after Election Day

Washington

• • • **The surplus property** bill passed by Congress last week is due for major revision after election to provide administrative standards and safeguards for business and government absent in existing legislation, informed Congressional sources predict.

Major provisions of the bill are:

1. Three-member Surplus Property Board of which one member is chairman to be appointed by the President and confirmed by the Senate.

2. The Board is given blanket authority over the disposition of surpluses except during the war; it cannot declare surpluses unless procurement agencies agree. Surpluses not being used by the War and Navy Departments may be reported to Congress.

3. The Board has freedom of discretion in appointing disposal agencies, except that the Maritime Commission is designated to liquidate surplus shipping.

4. The Board must establish uniform regulations to give wide advance public notice of all sales with an adequate time interval between notice and sale so that all interested purchasers will have a fair opportunity to buy.

5. Disposal agencies must maintain records of inventories and sales open for public inspection in local offices.

6. Surpluses may be sold and exchanged between government agencies.

7. Local government and non-profit institutions may buy surpluses and when the government gets an advantage from the sale and activities of the local government or non-profit institution, it is provided that such purchasers may get special prices.

8. Property of no commercial value may be given away to states, or to any government agency or institution, or to any non-profit, educational or charitable organization, or may be ordered destroyed.

9. Airports and harbor and port terminals are to be offered for sale first to States. States also get special consideration in sales of surplus power transmission lines, highways, streets and rights of way.

10. Owning agencies can sell any property for war production and authorize contractors to sell or retain any termination inventories for the purpose of war production, or for other purposes as authorized by the board.

11. Owning agencies can sell property damaged or worn beyond economical repair, any waste, salvage or scrap or any similar items, or any product of industrial research, agricultural or livestock operations, or of any public works construction or maintenance project carried on by an agency (must not consist of strategic metals or minerals).

12. Disposal agencies may sell under any terms they think proper and may extend credit. No credit beyond three years shall be extended for any of the following: raw materials, consumer goods and small tools, hardware and non-assembled articles which may be used in the manufacture of more than one type of product.

13. Veterans are to be given special preference in acquiring surplus property.

14. Farmers and farmer cooperatives will be aided by AAA in getting agricultural machinery and other assistance.

15. Smaller War Plants Corp. is given authority to purchase surpluses for resale to small business and the Board is supposed to prevent discrimination against small business by selling in small lots.

16. SWPC is authorized to make or guarantee loans to small businesses to acquire and operate surplus plants and to cooperate with disposal agencies to sell to small business on credit.

17. The Surplus Property Board has to report to Congress on all surplus plants the original cost of which was more than $5,000,000, setting forth (a) the cost, location and other description; (b) economic problems which may be created by the sale or other disposition; and (c) a plan or program for the care and handling, disposition and use of the property.

18. While the Surplus Property Board is authorized to immediately sell aircraft plants and facilities, shipyards and transportation facilities and radio and electrical equipment, it is not authorized to sell any of the following classes of property until 30 days after submission of the foregoing required report: aluminum, magnesium, synthetic rubber, chemical, iron and steel, aviation gasoline, petroleum pipelines, surplus plants and facilities, and patent processes, techniques and inventions except as are necessary to the operation of the plants and facilities listed.

19. Machine tools and equipment not necessary to the operation of a surplus plant may be sold by the Board and the section does not apply to any government-owned equipment

ALUMINUM HEADS: *Workers at the Tube Turns Corp., Louisville, Ky., admire two crates of forged aluminum heads for aircraft engines produced by the company. The heads are made from a single bar of aluminum in 8 and 9 in. upsetters. Four operations are required.*

or other property operated as an integral part of a privately-owned plant and which is not capable of separate operation as an independent unit.

20. The Anti-Trust Division must approve all sales of plants originally costing $1,000,000 or more and the attorney general has to give his opinion within 90 days after receiving notification of sale.

21. Strategic minerals and metals are to be transferred by owning agencies to Treasury Procurement when they are surplus and added to stockpiles previously authorized by law.

When WPB sees a deficiency of metals and minerals for civilian purposes, owning agencies don't have to transfer surpluses but may hold for six months and sell them to industry at the market prices.

The Army and Navy Munitions Board has to submit a report on the amounts of various strategic minerals, metals and materials it wishes to maintain in stockpiles. Within one year after the report, all accumulations considered surplus by ANMB can be sold by disposal agencies.

22. Surplus property sold abroad may not reenter the United States except property sold to servicemen for personal use.

23. The procurement agencies are directed to make advance determinations on machinery equipment to see if it is needed for standbys.

1100 Mile Pipeline Planned From Montana to Puget Sound

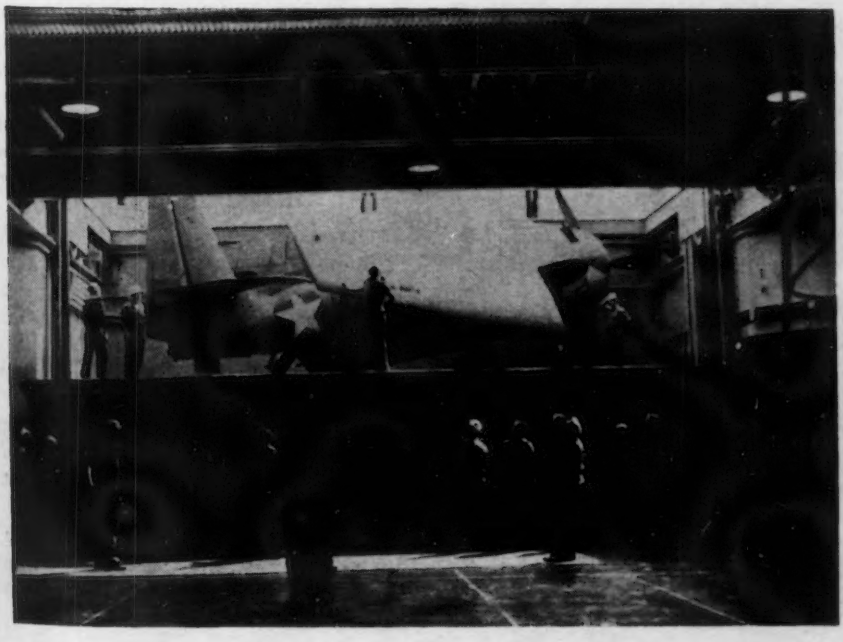
Seattle

• • • **An 1100-mile pipe line from central Montana to Puget Sound with a 100 acre petroleum storage farm with 960,000 barrel capacity at Renton is among the definite prospective postwar projects for the Pacific Northwest. The North Pacific Pipeline Co., a group of independent oil operators of Billings, Mont., is planning the project. In addition to the 10-in. line, work on which it is hoped to start early in 1945, the plans call for building a $5,000,000 refinery on a 25-acre site south of Seattle's city limits, with an initial capacity of 35,000 barrels a day. C. O. Rison, executive vice-president, has been making arrangements in the State of Washington and states that the company is already incorporated for $30,000,000 and financed in Montana and Wyoming.**

Construction is being rushed to complete the Navy's 40-mile railroad extension on the Olympic Peninsula to run from Shelton, Wash., the Northern Pacific branch's terminal at the south end of Puget Sound, up to the Bremerton Navy Yard. The railroad itself is costing $4,000,000 and the overall construction project, including an ammunition depot, is running $18,000,000. Feverish haste is being made to complete the railroad by the first of the year. Relay rail from all sections of the country, from 72 to 90 lbs., have been rounded up and bridge loadings will be twice the bridge capacity of the Northern Pacific branch line into Shelton.

Joshua Hendy Iron Works at Sunnyvale have appointed the Alaska Pacific Supply Co. in Seattle as their agents for Hendy marine and stationary diesel engines and parts. Hendy diesels are at present available in sizes providing up to 675 h.p. It is announced that currently Hendy is building more than 100 diesel-generator sets to provide auxiliary power for the Maritime Commission's new Cl-M-AVl cargo ships.

UP SHE GOES: *Riding the elevator of a U. S. Aircraft Carrier in the Pacific, a powerful torpedo bomber is lifted to the flight deck to begin another mission over enemy bases.*



MPR 241 Amended With Reference to Sales Of Malleable Iron Castings

Washington

• • • **As it had done previously with respect to gray iron castings, WPB has amended MPR 241, excluding from the regulation malleable iron castings sold by "regular resellers" as parts or subassemblies of the types listed in Appendix A or 3 of MPR 136. The amendment eliminates conflicts of jurisdiction between the two regulations and means that castings sold as parts or subassemblies by regular resellers will be priced under MPR 136.**

A new paragraph was added preventing a seller who has been the recipient of a relief order to compute his maximum prices by adding the increase granted to him to an increase established for the industry generally. The seller, however, was permitted to use either the relief granted to him individually or the increase granted to the industry generally, since if the former is greater than the latter, the reasons for the individual grant would still prevail.

The action taken with respect to both malleable and gray iron castings was identical and became effective Sept. 25. Gray iron castings were removed from MPR 244.

Under the changes, records and reports must be kept for a period not longer than two years or for so long as the Emergency Price Control Act of 1942 as amended remains in effect.

August Iron Ore Consumption Was Close to 1942-1944 Average Level

Cleveland

• • • **August consumption of iron ore** from Lake Superior sources in the United States and Canada totaled 7,341,964 gross tons, holding fairly close to the level of consumption for the past two years. Since January, 1942, consumption has averaged 7,326,000 gross tons per month, as can be observed by the lack of fluctuations in the dotted line on the accompanying graph.

This chart reflects Lake Superior iron ore shipments, consumption and stocks for the period from Jan. 1, 1942 to Sept. 1, 1944. The consumption of 7,341,964 gross tons of iron ore during August brought the total Lake Superior ore consumption for the year up to 59,003,927 gross tons.

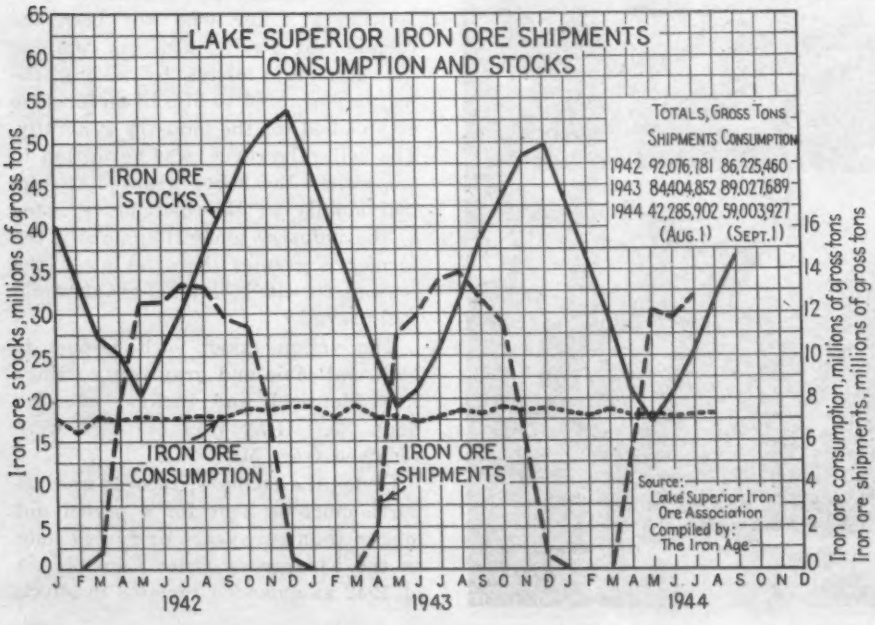
From all indications, unless there is an acute drop in steel production during the remainder of the year, ore consumption during 1944 will hit an all-time high record. However, a sudden end of the war in Europe might drastically curtail steel output and consequently ore consumption would decline.

Stocks of iron ore at furnaces in the United States on Sept. 1 totaled 31,364,240 gross tons; in Canada, 1,362,772 gross tons; and at Lake Erie docks (U. S. only), 4,516,310 gross tons, bringing total ore stocks downlake to 37,243,322 gross tons. These stocks are slightly over 1,300,000 tons less than what existed on Sept. 1, 1943, when 38,571,667 tons were on hand.

While stocks are not as high as they were a year ago, it is not necessarily because shipments are down. Shipments, while not as high as in the 92,076,781 ton record year of 1942, are substantially above those of 1943. It might be recalled that 1943 shipments were 84,404,852 gross tons, far below the expected level, resulting mainly from bad weather conditions throughout the entire lake shipping season last year. A late start in shipping coupled with an early closing and fogs throughout the summer slowed up lake traffic considerably and caused quite a few accidents to the lake carriers.

This year, with all of the vessels built by the Maritime Commission in service and 11 Canadian boats in the American ore trade, the lake traffic has been heavy in the movement of ore as well as grain and coal. An unusually heavy grain crop this year might mean that a substantial number of the boats will be taken out of ore service before the shipping season closes.

Presently, there are 312 ore vessels in commission with 303 engaged in the ore trade. This time last year there were 312 vessels engaged in ore shipping, but, as stated before, ore shipping was slowed up by the weather.


LAKE SUPERIOR IRON ORE SHIPMENTS
CONSUMPTION AND STOCKS
TOTALS, GROSS TONS
SHIPMENTS CONSUMPTION
1942 92,076,781 86,225,460
1943 84,404,852 89,027,689
1944 42,285,902 59,003,927
(AUG. 1) (SEPT. 1)
IRON ORE STOCKS
IRON ORE CONSUMPTION
IRON ORE SHIPMENTS
Source: Lake Superior Iron Ore Association
Compiled by: The Iron Age
Iron ore stocks, millions of gross tons
Iron ore consumption, millions of gross tons
Iron ore shipments, millions of gross tons
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1942
1943
1944

Industrial Wages Hit New High in July

New York

• • • **Average hourly** earnings of all wage earners in the manufacturing industry rose 0.3 per cent in July to reach a new all-time high of $1.072, according to the regular monthly survey of 25 manufacturing industries by the National Industrial Conference Board.

This figure, which includes overtime and other monetary compensation, marks the latest peak in an upward movement which has lasted for 11 years. At $1.072 per hr., hourly earnings were 5.1 per cent above the July, 1943, level, 41.2 per cent above that of Jan., 1941 (the Little Steel formula base), and 48.9 per cent above that of Aug.. 1939.

All other payroll factors in July declined from June, primarily because there was an appreciable falling off in employment for the eighth consecutive month.

Key figures of the Conference Board's survey for July are as follows:

Weekly earnings averaged $48.87, a decline of 0.9 per cent from June. They were still 5.9 per cent higher than in July, 1943, 59.7 per cent above Jan., 1941.

"Real" weekly earnings, which measure the quantities of goods and services that can be purchased with dollar weekly income, dropped 1.3 per cent but remained 3.7 per cent above a year earlier.

Hours worked per week declined in July by 0.4 hr., or 0.9 per cent. The 4.5 hr. averaged in July were half an hr. or 1.1 per cent more than were worked in July, 1943, and 5.3 hr., or 13.2 per cent, more than in the Jan., 1941, week.

Employment in the 25 manufacturing industries fell off 0.9 per cent in July. Since July, 1943, there has been a drop of 7.0 per cent, but the total exceeded the Jan., 1941, level by 26.7 per cent.

Man-hours in July were 1.8 per cent lower than in June, 6.0 per cent below July, 1943, and they remained 43.4 per cent above the Jan., 1941, level.

Payrolls declined 1.8 per cent from June. They were 1.5 per cent less than in July, 1943, but 102.3 per cent greater than in Jan., 1941.

American Iron and Steel Institute Receives Highest Award

New York

• • • Control of certain industries in aggressor nations is worthy of serious consideration by those with the responsibility of preserving world peace, Walter S. Tower, president of American Iron & Steel Institute, asserted recently in accepting the Distinguished Service Award of the Army Ordnance Department at a luncheon in the Waldorf-Astoria.

The award was presented by Maj. Gen. G. M. Barnes, Chief of Ordnance Research and Development Service, "in recognition of outstanding and meritorious engineering advisory services, in war and peace, for the development, manufacture and maintenance of ordnance material."

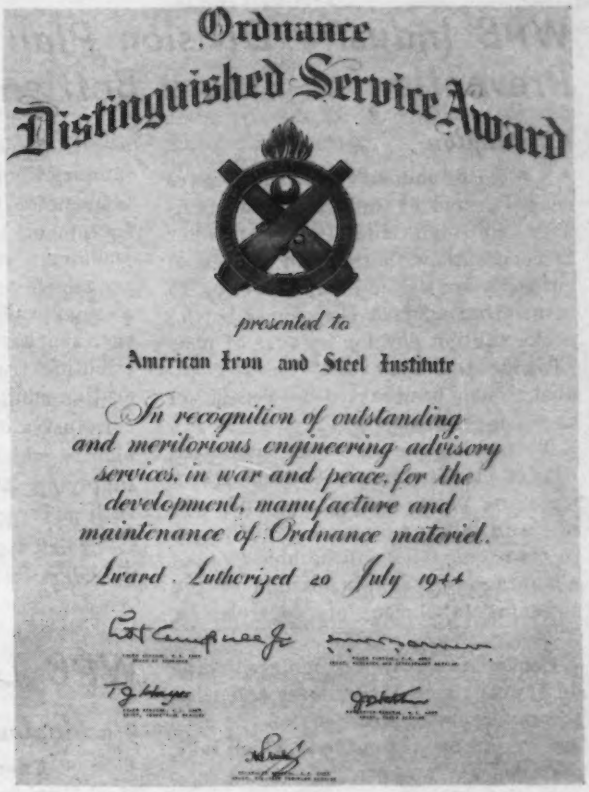
Institute committees of operating and technical men in the industry through the war assisted the Ordnance Department, as well as other branches of the Armed Services, in the development of steels that conserved alloys, steels that provided greater strength and steels that helped achieve new destructive power for projectiles. At the same time such developments as the use of seamless steel tubing for gun barrels helped provide the United States with an abundance of weapons in a comparatively short time.

Mr. Tower, as he set forth for consideration the question of control over industries in aggressor nations, emphasized that careful study of the relations of such industries both to peace and to war would be required.

"What such study would indicate as to the type and extent of control necessary can hardly be set forth offhand," said Mr. Tower. "But the subject is worthy of most serious consideration by those whose responsibility and opportunity it is to try to preserve peace in the world."

At the presentation luncheon, B. F. Fairless of United States Steel Corp., vice-president of the Institute, introduced the speakers who included Quincy Bent of Bethlehem Steel Co., chairman of the Institute's Committee on Manufacturing Problems, and O. U. Cook of Tennessee Coal, Iron & Railroad Co., chairman of the General Technical Committee of the Institute, in addition to Mr. Tower and Maj. Gen. Barnes.

Maj. Gen. G. M. Barnes, chief of research and development service, Army Ordnance Department, in presenting the award, reminding those present that the Ordnance Department has a long and honorable record in furnishing the nation with weapons for all wars during the past 132 years. He said it was established in principle by Gen. George Washington when he recommended the construction of Springfield Armory in 1794, where today the famous Garand rifle is manufactured. The Ordnance Department, he said, was established as an organization in 1812, and the Ordnance escutcheon is one of the oldest insignias.


Ordnance
Distinguished Service Award
presented to
American Iron and Steel Institute
In recognition of outstanding and meritorious engineering advisory services, in war and peace, for the development, manufacture and maintenance of Ordnance materiel.
Award Authorized 20 July 1944

Cutback Information Plan Outlined

Washington

• • • War Mobilizer Byrnes announced a three part plan for giving cutback data to management and labor recently: The steps are:

(1) The WPB Production Executive Committee shall collect cutback and termination information from the procurement agencies and put it in summary form. This information is to be circulated to all government agencies concerned.

(2) Procurement agencies will make the information available to management and labor, and WPB will furnish national management and labor organizations summarized general information relating to the size and location of cutbacks.

(3) WMC will advise field representatives of major cutbacks so they can more efficiently assist in the placement of released manpower.

After X-Day the PEC Staff will no longer review individual program slashes because of administrative difficulties, Mr. Byrnes said.

COMING EVENTS

Oct. 3—Steel Distributors Institute, Inc., New York.

Oct. 5-7—SAE National aircraft engineering & production meeting, Los Angeles.

Oct. 5-7—National Electronics Conference, Chicago.

Oct. 5-6—AIME Electric furnace steel conference, Pittsburgh.

Oct. 10-11—Gray Iron Founders' Society, Inc., Cincinnati.

Oct. 12-14—The Electrochemical Society, Inc., Buffalo.

Oct. 16-20—National Metal Congress, Cleveland.
American Society for Metals.
American Welding Society.
Society for Experimental Stress Analysis.
American Institute of Mining & Metallurgical Engineers, Iron and Steel Division and Institute of Metals Division.
American Industrial Radium and X-Ray Society.

Oct. 31-Nov. 1-2—American Institute of Steel Construction, annual meeting, Atlantic City, N. J.

Nov. 2-3—Industrial Management Society, National Time and Motion Study Clinic, Chicago.

Nov. 27-Dec. 2—National Exposition of Power and Mechanical Engineering, New York.

Dec. 4-6—SAE National air cargo meeting, Chicago.

WPB Industry Division Plan For Prevention of Future Bottlenecks

Washington

• • • WPB industry divisions have been directed by Industry Operations Vice-Chairman Hiland G. Batcheller to cooperate with those in charge of cutbacks in the military services to insure that when X-Day comes bottlenecks will not develop because of poor "Termination Tailoring." The steel industry has been asked to report on open capacity.

This week the divisions submitted lists of plants which have to be freed, including prime contractors and suppliers in selected lines of manufacture so that industries will be able to take advantage so far as possible of the sweeping abolition of controls on X-Day.

Conferences will be held with Industry Advisory Committees and with the procurement divisions of the services to arrive at final lists which take precedence.

Arthur H. Bunker, WPB chief of staff, told THE IRON AGE that every effort would be made to deal with all the various industry groups as soon as it is administratively possible. Other WPB officials said that the cuts will be made on the most just basis the war agencies can find.

The list of indutries which have received first consideration follows: Coal mining machinery, railroad passenger car, commercial refrigeration and air conditioning, automobile and light truck, refrigerator, washing machine, oil burner, stoker, waterheater, rail, radio, electric transmission equipment, dry cleaning and commercial laundry equipment, domestic watt hour meter, lead control and telemetry equipment, trolley coach, bus, sewing machine, vacuum cleaner, electric range, electric fan, non-electric commercial cooking stove, office machinery, typewriter, telephone, small distribution transformer, electrical generating equipment.

Industry divisions are also checking plants which formerly engaged in supplying the foregoing industries with motor gears and other necessary components. While the list is preliminary, it may be added to or subtracted from, Mr. Bunker made clear.

The reason the named industries were selected for first consideration in the tailoring of cutbacks is that WPB officials believe if these major manufacturing lines are well started in reconversion, the rest of industry is likely to experience a smoother transition to civilian manufacture.

Reports coming from steel producers show generally that it has not caught up on war work, except in tool steel. There is, however, a distinct shortening of delivery period for numerous steel products for the war program due to cancellations. As a result there are prospects of much open capacity beginning in the fourth quarter for some lines of production and growing open capacity in the first quarter, some as high as 100 per cent.

WPB Loses Experienced Steel Men

Washington

• • • Charles H. Longfield, WPB Steel Division assistant director of production, and chairman of the division's Production Directive Committee, has resigned effective Sept. 30 to return to the Youngstown Sheet & Tube Co. as general sales manager. Mr. Longfield has spent three years in Washington away from his company.

Harry Francis of the American Steel & Wire Co. succeeds Mr. Longfield as assistant director for production. Richard Sentner becomes chairman of the Production Directive Committee. Mr. Sentner is from the Wheeling Steel Corp.

Walter Wiewel, chief of the Tubing Branch and vice-chairman of the Production Directive Committee, has resigned to return to his post as assistant general manager of sales of the Jones & Laughlin Steel Corp. No appointment has been made to replace Mr. Wiewell as vice-chairman of the Production Directive Committee.

Chief of the Plate and Shape Branch Melvin W. Cole, who has also served WPB for three years, resigned last week. Mr. Cole returns to the Plate Division of the Bethlehem Steel Co.

CLEAR THE ROAD: *Members of an American engineer unit clear a highway near Luxembourg, using heavy tow equipment to roll a Nazi Mark V tank off the road.*

Facilities Applications Require Dec. 31 Completion

Washington

• • • Applications for steel facilities which cannot be completed before Dec. 31 will be turned down in the future by the WPB Steel Division under a policy recently approved by WPB Chairman J. A. Krug.

Previously, the agency had not set any terminal date beyond which the Steel Division could refuse to approve applications on this ground alone because no one wished to admit that the war might be over some time, a WPB spokeman said.

In a letter last week to all steel producers, Steel Division Director Norman W. Foy reminded them that CMP procedure provides that they can accept orders for civilian business and build up a backlog of orders upon which to work when X-Day comes.

Scrap and Steel Industry Turn Thumbs Down on Scrap Futures Market

New York

• • • **Both the steel and the scrap** industries for the past week have been bedeviled by a public argument over the proposal for listing scrap futures on the commodity exchange, an argument that would preferably have been kept private in that no good could accrue from spreading it before the public.

Back in 1940 this same proposal was made by a few interested parties but received little sympathetic treatment. The war effectively brought agitation to that end to a dead stop. Recently insofar as THE IRON AGE can determine, the same proposal has again been pushed by the Charles Dreifus Co. and Benjamin Schwartz and officials of the commodity exchange, with no support elsewhere in the scrap or steel industry.

Last week a meeting took place in New York, with officials of the scrap industry present, along with representatives of the Scrap Committee of the Iron and Steel Institute, officials of the commodity exchange, and several government officials. Close examination of the problem led to the unanimous conclusion that no good could come of making scrap a subject for what may be public gambling. It was pointed out that if scrap futures were offered, the mills would not buy them as they are in the steel business not the trading business. The futures must be bought by professional risk takers, which some observers consider an euphemism for suckers. The whole question is now "resting," at peace—the industry hopes.

Machine Tool Production Delayed

Washington

• • • **Members of the Machine Tool** Industry Advisory Committee at a recent meeting complained that wartime production and peacetime reconversion are being delayed by lack of manpower and were told by WPB officials that the situation will be called to the attention of the WMC Area Production Urgency Committees and Manpower Priority Committees.

Advisory committee members emphasized the fact that re-employment in the automotive and other peacetime industries depends upon the early supply of machine tools. They said that delays in delivery of components, particularly integral and fractional horsepower motors, in addition to labor shortages, has delayed machine tool production. WPB officials pointed out that urgent cases of component shortages could be handled by WPB's General Industrial Equipment Division.

Possible changes in WPB orders and regulations after V-E Day were discussed. Advisory committee members recommended retention of the principles of distribution provided by General Preference Order E-1-B. Retention of General Preference Order E-4 and L-147 was also recommended. The former covers delivery of second-hand machine tools needed for urgent programs. The latter standardizes electrical equipment on machine tools.

The backlog of unfilled rated orders for machine tools on Aug. 31, 1944, amounted to $195,000,000, WPB officials said. Machine tool shipments for the first eight months of the present year exceeded $350,000,000. August shipments were $34,817,000 preliminary reports indicate.

Aircraft Companies Sell Surplus Material for $1.00

Washington

• • • **Granted Treasury Department** permission allowing losses resulting from such sales as inventory losses for tax purposes, aircraft manufacturers have turned over to the Metals Reserve Co., for the nominal sum of $1, certain excess stocks of raw materials, parts, components, etc., which they cannot use and must dispose of. The materials to be purchased include in part odd lots and odd sizes, shapes, etc., resulting from changes in types, designs and engineering of plates. The proceeds of the sale of the materials, when redistributed or disposed of as surplus, will accrue to MRC.

Secretary of Commerce Jesse H. Jones said that the principal reasons for the program are:

To prevent the uncontrolled marketing of such materials, through speculators and scrap dealers who otherwise would buy them from the aircraft manufacturers at sacrifice prices, thus seriously affecting the market value of government-owned materials reported as war surplus; and to inventory and segregate the material, some of which can be redistributed for war production and for other useful purposes.

Outlaw Strikes Cut Into Steel Output

Pittsburgh

• • • **Strikes cut sharply into steel** production in the Pittsburgh and Cleveland areas during the past week. The Corrigan McKinney plant of Republic Steel Corp. at Cleveland was closed early this week when 140 trainmen, forcing about 4000 other workers into idleness, went out on strike. The strikers, members of the Brotherhood of Railroad Trainmen, work on the company's river terminal railroad. The cause was alleged to have resulted from the dismissal of a trainman for refusing to obey orders. The strike ended and partial production was started Sept. 26.

Meanwhile, an eight-day strike at the Clairton works of Carnegie-Illinois Steel Corp. ended recently. This strike, which lost 16,000 tons of steel, resulted when pilers refused to pile scrap and chippers went out in sympathy. It brought down the entire open hearth shop at Clairton, as well as the 14, 16, 21, and 22-in. mills, which are bar and structural mills, and the 40-in. blooming mill.

A turn dispute at the Carnegie-Illinois Duquesne works resulted in a strike of the pouring platform employees of the open hearth shop recently. This strike, however, lasted only a couple of days.

At the Irwin works of Carnegie-Illinois, the indirect crew of the finishing department of flat rolled products went out on strike for one day on Sept. 22. There was no grievance filed here, and the workers were back to work the next day.

WPB Amends Its Rules

Washington

• • • **WLB has amended its rules** of procedure to provide that 12 substitute representatives of labor and industry may be named to serve on regional boards in the absence of regular or alternate representatives of their respective groups. Previously the number of substitute members was restricted to eight for each side.

Industrial Briefs . . .

• ACQUISITION—Walsh Holyoke Steam Boiler Works, Holyoke, Mass., has joined Continental Industries, Inc., a New York investment and management company.

• OPENED OFFICE—L. B. Foster Co., Inc., has opened a Pacific Coast office in the Russ Building, San Francisco, under the management of William H. Scanlon.

• ENLARGES FACILITIES — Mall Tool Co., Chicago, has constructed an addition to its plant for the manufacture of small tools.

• NEW OFFICES—Associated Industries of Ala. has moved offices from 704 Brown-Marx Building to 812-22 Comer Building, Birmingham.

• PURCHASED PLANT — Lempco Products, Inc., Bedford, Ohio, has purchased the Cleveland Pressed Steel Co. A new addition will be made to the plant. It will be operated under the present name with no changes in personnel.

• PRODUCING RADIOS—Westinghouse Electric & Mfg. Co.'s plant at Sunbury, Pa., has been selected as the company's manufacturing plant for the production of home radio receivers.

• SETS RECORD—Colorado Fuel & Iron Corp. set a new weekly production record in the open hearth department with production of 27,322 net tons.

• GRADUATE COURSE — Allis-Chalmers Mfg. Co., in cooperation with Illinois Institute of Technology, has launched a new post-graduate educational course which will lead to a Master of Science degree in electrical or mechanical engineering, to be taught at the West Allis, Wis., plant.

• MOTION PICTURE AVAILABLE—Meehanite Research Institute of America, Inc., Pershing Square Building, New Rochelle, N. Y., has a color film available upon request entitled, "The Flow of Metal Into Molds." It consists of two reels and is for 16 mm. projection without sound.

• NEW NAME—Dallas Tank & Welding Co., Inc., Dallas, Tex., has shortened its name to The Dallas Tank Co., Inc.

• NEW MIDWEST OFFICES — Kennametal, Inc., Latrobe, Pa., has opened offices at Kansas City and St. Louis, both under the direction of R. B. Weeks.

• NEW REGIONAL OFFICES — Hydraulic Press Mfg. Co., Mount Gilead, Ohio, has established two new regional and branch offices at 500 Fifth Avenue, New York, with Mills N. Ripley in charge; and at 717-9 Hanna Building, Cleveland, with C. R. Terry as sales manager.

• BRANCH OPENED — Mechanical Handling Systems, Inc., Detroit, has opened a new office at 1224 Commercial Trust Building, Philadelphia. J. F. O'Hara is manager.

• DISTRIBUTOR APPOINTED — Carboloy Co., Inc., has made the Garrett Supply Co., Los Angeles, distributor for the southern California-Arizona area.

• PRODUCING COR-TEN—Lukens Steel Co. has been licensed to manufacture Cor-Ten, well-known corrosion-resisting high strength low alloy steel, developed by Carnegie-Illinois Steel Corp. It has heretofore been produced solely by subsidiaries of U. S. Steel Corp.

• CHANGING NAME — Grayson Mfg. Co. has changed its name to Tung Tip Tools, a division of Lowell & Grayson.

• ADDITIONAL TOOLS — Warren Industries, Warren, Mich., in addition to its regular line of special cutting tools, is now manufacturing precision gages.

DPC and Army Contract Awards

Washington

• • • **Defense Plant Corp.**, RFC subsidiary, has authorized the following contracts:

Westinghouse Electric & Mfg. Co., Pittsburgh, to provide additional equipment at a plant in Lester, Pa., at a cost in excess of $830,000, making a total commitment of more than $3,400,000.

International Business Machines Corp., New York, to provide additional equipment and machinery at a plant in Poughkeepsie, N. Y., at a cost in excess of $1,750,000, making a total commitment of more than $2,315,000.

Plymouth Rubber Co., Inc., Canton, Mass., to provide additional facilities at a plant in Canton, at a cost in excess of $150,000, making a total commitment of more than $500,000.

General Electric Co., Schenectady, N. Y., to provide plant facilities at Syracuse, N. Y., at a cost in excess of $27,500,000.

Monolith Portland Midwest Co., Los Angeles, to provide additional facilities at a plant in Laramie, Wyo., at a cost in excess of $335,000, making a total commitment of more than $4,640,000.

Campbell, Wyant & Cannot Foundry Co., Muskegon, Mich., to provide additional equipment at a plant in Muskegon at a cost in excess of $170,000, making a total commitment of more than $2,270,000.

Airesearch Mfg. Co. of Arizona, Inc., Phoenix, Ariz., to provide additional facilities at a plant in Phoenix, at a cost in excess of $100,000, making a total commitment of more than $1,835,000.

Union Wire Rope Supports Road Builders' Postwar Plan

• • • **A program for the postwar** employment of three million persons in the building of highways and indirectly supplying jobs to several million more has been presented by the American Road Builders' Association.

This plan proposes the annual investment of $3 billion in highway construction which would eventually result, the association emphasizes, in business transactions totaling $9¼ billion. The highway system in the United States at present is inadequate, has suffered from heavy war traffic, weathering and limited maintenance, the association claims.

In its booklet, "A Sound Plan for Postwar Roads and Jobs," the American Road Builders' Association points out that were all monies collected from registration fees, gasoline, municipal, county, personal property and federal user taxes and tolls be used for highway purposes, it would be sufficient to build and maintain the highway system proposed.

This program has not only won the support of the highway industry but is also being urged by companies like the Union Wire Rope Corp., Kansas City, which are indirectly involved in highway construction.

THERE'S NO ELIXIR TO CURE YOUR CLEANING PROBLEMS

IT'S REALLY *pH* THAT DOES THE JOB!

Kelite has developed scientific cleaning and processing through pH Control. pH Control is the "yardstick of chemistry." Just as degrees Fahrenheit are a measurement of temperature, or inches a measurement of lineal distance, or pounds a measurement of weight—so pH is a measurement of cleaning effectiveness when used in the copyrighted Kelite method.

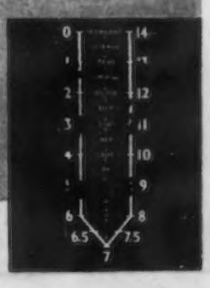
Soil, grease, corrosion, paint, fruit stains, yes, in fact every substance in the universe has a definite location on the Kelite pH chart. Thus it is simple to select a material of correct pH value to reduce contamination to a neutral state, or to break the adhesion of an undersirable coating, or to dissolve a substance so that it may be easily rinsed away.

Every Kelite Service Engineer is equipped to do pH testing right in your plant. His demonstration may seem like sheer magic to you, but he is really only applying a modern scientific principle to the age-old problem of cleaning.

Kelite invites your inquiry.

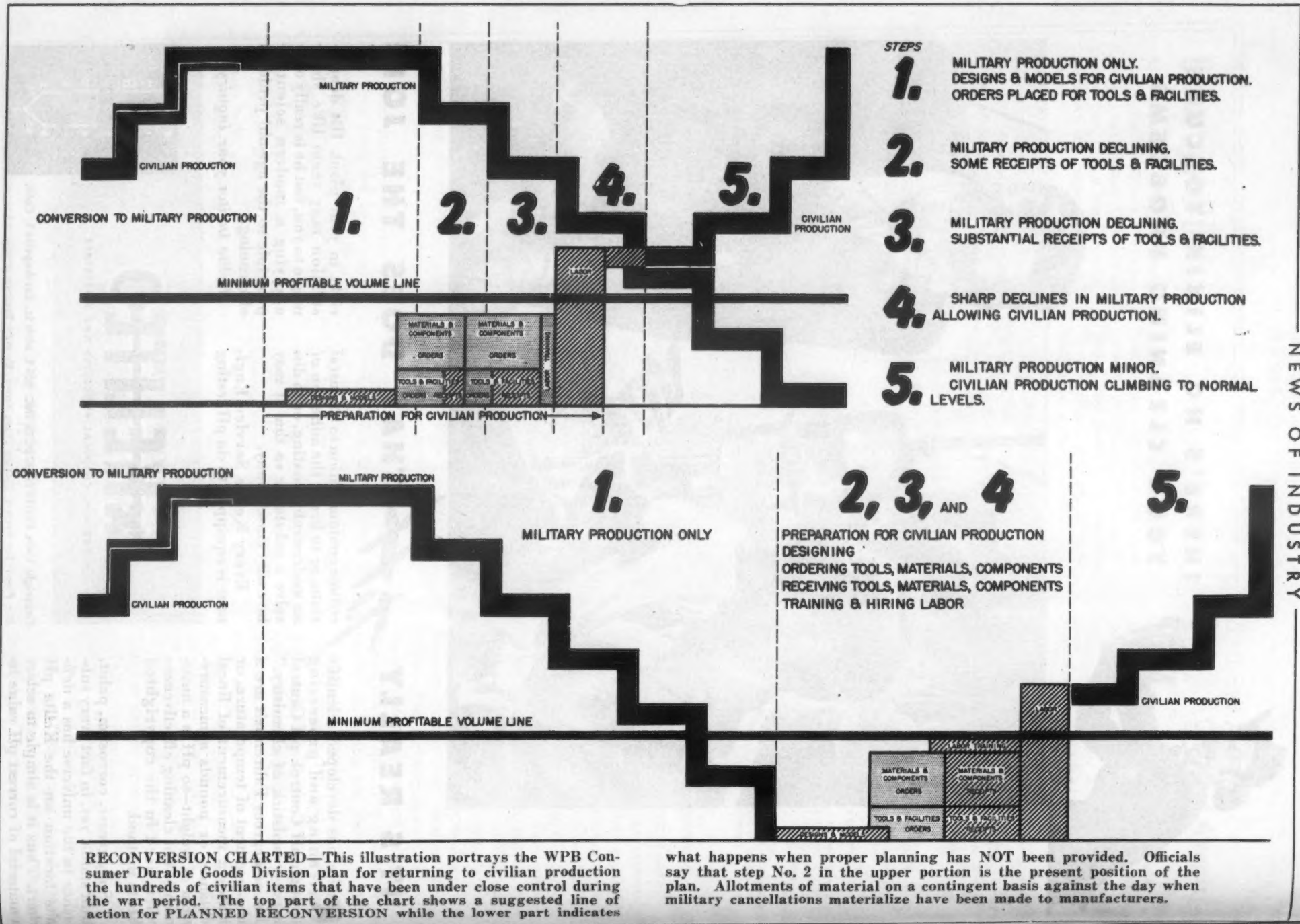
KELITE

INDUSTRIAL CHEMICAL PROCESSES AND MATERIALS



Copyright 1944, KELITE PRODUCTS, INC. 909 E. 60th St., Los Angeles 1, Calif.

Mfg. Plants: Los Angeles, Chicago, Perth Amboy, Houston. Branches in principal cities.



RECONVERSION CHARTED—This illustration portrays the WPB Consumer Durable Goods Division plan for returning to civilian production the hundreds of civilian items that have been under close control during the war period. The top part of the chart shows a suggested line of action for PLANNED RECONVERSION while the lower part indicates what happens when proper planning has NOT been provided. Officials say that step No. 2 in the upper portion is the present position of the plan. Allotments of material on a contingent basis against the day when military cancellations materialize have been made to manufacturers.

Specializing on NON-FERROUS and STAINLESS FASTENINGS

Only NON-FERROUS AND STAINLESS FASTENINGS

When you have a toothache you go to a dentist. When you need legal advice you go to a lawyer. Both men are specialists.

By the same token . . . when you need non-ferrous and stainless fastenings come to the house that specializes on them . . . Come to the Harper Organization which is concerned exclusively with the manufacture of bolts, nuts, screws, washers, rivets and specials of Brass, Copper, Naval Bronze, Silicon Bronze, Monel and Stainless...an organization not concerned with common steel.

This specialization brings refinements in product quality and "extras" in service to customers that are most rare. New Catalog ready soon.

THE H. M. HARPER COMPANY
2607 Fletcher Street • Chicago 18, Illinois
BRANCH OFFICES: New York City • Philadelphia
Los Angeles • Milwaukee • Cincinnati • Houston
Representatives in Principal Cities

HARPER
EVERLASTING FASTENINGS

ARMY E NAVY

BRASS
COPPER
BRONZES
MONEL
STAINLESS

plan. Allotments of material on a contingent basis against the day when military cancellations materialize have been made to manufacturers.

the hundreds of civilian items that have been under close control during the war period. The top part of the chart shows a suggested line of action for PLANNED RECONVERSION while the lower part indicates

Meet C. W. (Bud) BROKENSHIRE

SORRY you can't meet Bud in person. However, we do want you to feel that you know him better by this introduction.

Bud's tool and gauge experience has been gathered in 25 years of practical experience, as builder, user, designer and supervisor.

Although some of his time is used in answering your phone call or letter, his big job, as chief engineer, is to try to give you what you want on your job, when you want it.

Turner manufactures plain cylindrical plug, ring, snap, flush pin, built up and special gauges. For complete information write our sales department.

LOOK FOR *this stamp of precision. It is your guarantee of a Turner Precision-made Gauge.*

TURNER BROTHERS

TURNER GAUGE GRINDING COMPANY

2629 HILTON ROAD • • FERNDALE, MICHIGAN

GET ALL THE FACTS

This three-color folder tells you all about Turner's new Plast-O-Lock (pat. applied for) collet type gauge. This gauge is another first by the Turner Brothers in bringing to industry an improved type of standard plug gauge that will save you time and money in your inspection department.

WRITE TODAY FOR YOUR DESCRIPTIVE FOLDER

THE NEW TURNER PLAST-O-LOCK GAUGE

Automotive Engineers Indorse Use of Alloy Steel and Specifications

Milwaukee

• • • **Postwar use of low** alloy steels and specification on the basis of performance won qualified endorsement of speakers at the National Tractor Meeting of the Society of Automotive Engineers here Sept. 13-14.

H. B. Knowlton, International Harvester Co., declared, "The experience of war years has indicated that steels with lower alloy contents can satisfactorily be substituted on the basis of equivalent hardenability in most cases. Tests on gears and axles, however, have shown that there are other factors which should be given consideration.

"The (joint SAE-AISI) hardenability survey has shown that the range of hardenability for common steel is much wider, and the satisfactory minimum much lower, than usually supposed. Future work should be devoted to the study of individual parts and types of parts to determine the stresses which are actually encounted and the minimum properties of steel required for successful performance.

"A thorough study should be made of internal stresses produced by heat treatment and finally we should arrive at the most economical steels which will give satisfactory results in service."

Mr. Knowlton termed hardenability "one of the most important factors" in considering medium and high carbon steels, although he stressed other factors.

In prepared discussion on Mr. Knowlton's paper, W. H. Naegely, J. I. Case Co., predicted continued use of NE steels.

"Their use is the most economical method of developing properties required and economics usually wins," he said. "They may be adjusted when restrictions are lifted, but the principle will remain. We will need medium and higher alloys in greater quantities than ever for many applications, but it is just not good economics to waste them where they are not necessary."

Mr. Naegely also foresaw increased buying on the basis of performance, assuming that steel makers will find ways of narrowing hardenability ranges.

That this narrowing already had been achieved was revealed by John

You Can Count on Greater Tonnage and Longer Life in Every Continental Roll

Continental Back Up Rolls

Quality is a by-word with Continental craftsmen for theirs is a job of making the finest rolls for high speed mill operation.

This unusual skill, advanced engineering and modern equipment are your assurance of highest quality for all types of rolls.

Other products which Continental manufactures include Rolling Mill Equipment, Special Machinery and Carbon and Alloy Steel Castings. Continental Foundry & Machine Company.

CONTINENTAL FOUNDRY & MACHINE COMPANY

(FORMERLY CONTINENTAL ROLL & STEEL FOUNDRY COMPANY)

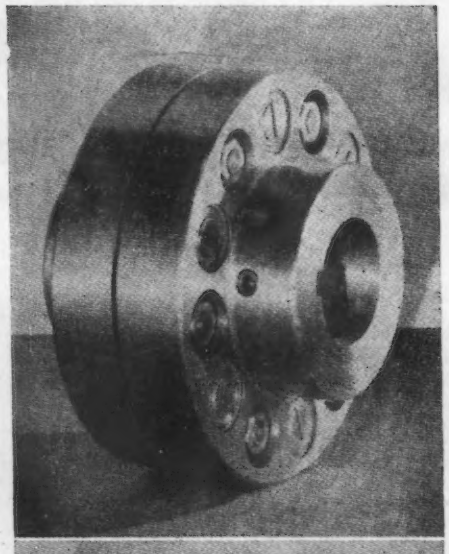
CHICAGO • PITTSBURGH

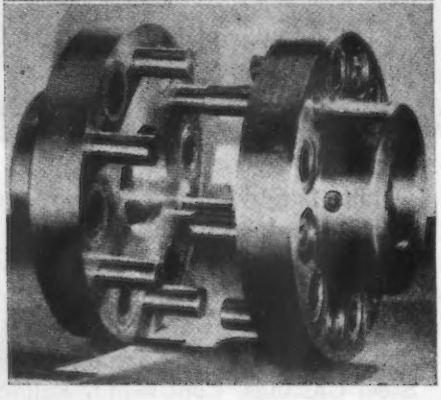
Try This For Ten Seconds

Just take a couple of pencils right now and try to hold them in perfect alignment without touching each other while you count 10.

This will quickly show you why a good flexible coupling is essential when connecting driving and driven shafts to prevent excessive bearing wear due to unavoidable misalignment.

Ajax Flexible Couplings have been doing this job for 20 years. They do it without lubrication because of their rubber bushed, graphited - bronze bearings and interlocking drive studs. Write for the facts on Ajax Flexible Couplings.





ARMY E NAVY

AJAX Flexible Coupling Co.
Incorporated 1920 WESTFIELD, N.Y.

Mitchell, Carnegie-Illinois Steel Corp., one of the developers of the NE series. He fully approved the principle of allowing steel manufacturers to adjust analyses to meet hardenability requirements and individual plant needs, stating that bands were practical as far as steel production is concerned. He pointed out that the large percentage of NE heats melted were outside the bounds of specified AISI chemical analysis specifications but met hardenability requirements.

G. C. Riegel, Caterpillar Tractor Co., supported endorsement of the NE steels.

"The simplest, the most reliable and the least time consuming tests which will predict the performance of the automotive steels are probably those tests calculated to measure the hardness intensity, the depth of hardness penetration, the notch toughness corresponding to the hardness levels used in the structure and at the extremes of temperature to be encountered in service," he said. "If no other guides were available in the whole field of mechanical testing a rather satisfactory evaluation could be made by these three simple expedients."

He pointed out that surface hardness could be easily determined, stating that this parallels strength in tempered steels, and that the Jominy test provided a means of predicting hardness penetration.

"By knowing intensity of surface hardness and depth of hardness penetration after quenching it becomes a simple matter to temper or draw back the stress in the quenched part until the engineer has obtained a stress adequate to oppose the stresses of service."

Therefore, he concluded, the NE steels are satisfactory even in highly stressed gears, despite their smaller alloy content.

Turning to another phase of Mr. Knowlton's paper, Mr. Riegel declared, "Since little or no material of good engineering design fails in tension (that is, due to inadequate strength) it has been emphasized by the author that our concern for failures of engineering structures is usually due to the so-called fatigue failure or progressive fracture which reveals the "oyster shell" pattern starting from some localized weakness. Notches, holes, changes of section, gross scratches, etch or corrosion pits all furnish localized weaknesses from which failures may start. Laboratory fatigue tests which do not take into account these conditions

WE CAN CAST YOUR INGOT

Sizes up to 42" Diameter

The melting facilities of the Barium Steel Shops are now available for your work — as are the other skilled Barium Unified Control services of forging, heat-treating and machining.

Melting Facilities consist of several open hearth furnaces up to 35 tons in size . . . now melting and meeting all analyses of carbon and a range of alloy steels to the critical tests of Aircraft and United States Government specifications. We are able to cast ingots up to 42" diameter and 40,000 pounds — and also to carry through all subsequent operations of forging, heat-treating and machining.

Other facilities include: 1500-ton and 1000-ton FORGING PRESSES for your heavy requirements and STEAM FORGING HAMMERS of up to 12,000-pound capacities for flat die work . . . HEAT-TREATING AND ANNEALING FURNACES of the best modern type . . . MACHINING FACILITIES and a well-equipped CHEMICAL AND METALLURGICAL LABORATORY.

You may have Barium *Unified Control* on all these services — or put us to work on one or more. Tell us what you need.

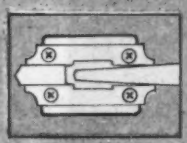
BARIUM
STEEL CORPORATION
Producers of Carbon, Alloy and Stainless Steels
CANTON · OHIO

HOLTITE
PHILLIPS
SCREWS & BOLTS

meet every styling requirement in your Post-War products plans

FASTENINGS FOR EVERY PURPOSE

IMPROVED STYLE AND APPEARANCE



The neat design of HOLTITE-Phillips recessed heads makes them an attractive supplement to decorative hardware or exterior finish.

NO BURRS TO TEAR OR SCRATCH

Driven easily, HOLTITE-Phillips heads do not burr, thus saving filing operations where burrs would tear clothing or injure hands.

CUT DRIVING TIME IN HALF

As bit cannot slip from the HOLTITE-Phillips recessed head, spiral and power drivers can be safely used even on finished parts.

Though scientifically designed to cut fastening time 50% and more, HOLTITE-Phillips recessed head presents a design that meets every decorative requirement.

Neat in appearance with heads in any position, a quarter turn will line them up for added attractiveness and symmetry. Furnished in any metal with plated or painted finish to match any material.

Wartime conservation makes it impossible to send catalogs unless requested on your company letterhead

CONTINENTAL SCREW CO. New Bedford, Mass., U.S.A.

BUY MORE BONDS

are usually of little value in correlation with service performance."

Importance of thorough knowledge of basic gear design principles was stressed by Fred Bohle, chief engineer, Illinois Tool Works, in discussing "The Design of Gear Teeth." Designing, laying out and proper dimensioning of the gear tooth and an analysis of the line of action picture were described as the basis of this knowledge.

After reviewing the fundamentals of good gear design, he mentioned some "tricks" which assist performance and noise reduction. Helical gears run smoother than spur gears due to the nature of the contact between mating helical gears which develops gradually on one side of the gear then spreads across the width.

"The active part of the line of action is greatly increased through the helical arrangements of the teeth and there is never any trouble obtaining the minimum requirements for overlap. As a matter of fact, helical gears should be so designed in width and helix angle that the action of the pitch line helices alone provides for complete carryover action from one tooth to another. This is not necessarily a hard and fast rule but is a good guide anyway.

"Another trick to reduce noise and smooth out the action of gears is to relieve the involutes slightly near the tip of the tooth. This is done particularly on hobbed and shaped gears but not on shaved and ground gears. All standard gear generating hobs are automatically made to cut a small amount of tip relief. The effect of the tip relief is to let the driving gear lag slightly and thus pick up gradually any spacing errors which might be present This action of the tip relief would, of course, be nullified by an opposing involute which is fat at the bottom. However, shop men know how detrimental a fatness at the base of the tooth is and usually stay away from it."

F. L. Knowles, Gleason works, enlarged upon bevel gears in prepared discussion of Mr. Bohle S. Paper.

"An advantage of curved tooth bevel gears from their inception and recently introduced in straight bevels is the localized lengthwise tooth contact or tooth bearing referred to as 'crowning' in spur gears, he said." This allows a slight amount of adjustment or mismatch of the gears in assembly and some displacement under OPR operating loads without concentration of the loads on the ends of the teeth.

"The conical form of bevel gears

ANTI-CAN'T *weapon?*

TRY THIS ON THOSE DIFFICULT AND HIGH COST GRINDING JOBS

Where precision parts in volume are the order of the day, this small, compact, sleek steel cylinder is playing a vital part in the successful production program of innumerable war plants. It is the quill, the heart of the Dumore Precision Grinder, whose precision and stamina transform standard machine tools such as lathes, planers, and millers into production grinders of high precision . . . *and at remarkably low cost.* Exceptionally high speeds (up to 42,500 r. p. m.) and vibrationless operation (precision to ±.0001") are Dumore characteristics which lend themselves to internal grinding of small diameter holes, an operation at which the Dumore is unsurpassed. External cylindrical, too, as well as surface and thread grinding are handled with equal precision over the Dumore's wide range of capacity. Changes in production requirements are made easily, with slight cost, when you rely on this dependable, versatile tool. Consult your distributor for ways of applying the Dumore Grinder to your specific operations, or write direct to The Dumore Company, Tool Division, Dept. TJ24, Racine, Wisconsin.

The Dumore, with a spindle speed of 42,000 r.p.m. facilitates grinding a half-inch hole to a tolerance of plus or minus one-ten-thousandth of an inch. Such work can be satisfactorily accomplished only with the combination of high speed and vibrationless precision which characterize the Dumore.

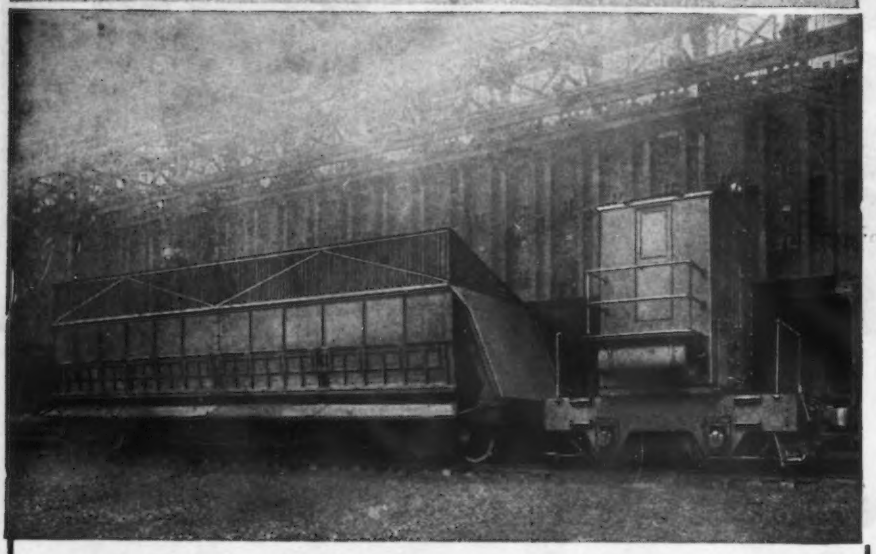
Numerous methods of speeding production and cutting costs on precision grinding are shown in Catalog 42. You'll want a copy . . . Write for it today!

DUMORE

PRECISION AND OFF-HAND GRINDERS

SOLD BY AUTHORIZED INDUSTRIAL DISTRIBUTORS IN ALL PRINCIPAL CITIES

COKE OVEN EQUIPMENT



QUENCHING CARS AND LOCOMOTIVES

All Atlas Coke Oven Equipment is of heavy-duty construction permitting the peak operating conditions required in today's stepped-up production schedules. As a result of years of experience, Atlas is able to design and build equipment, to meet the requirements of each particular coke plant. Detailed information available on request.

Other ATLAS Products

Ore Transfer Cars
•
Scale Charging Cars
•
Electrically Operated Cars for Every Haulage Purpose

Locomotives for Switching and Interplant Haulage
•
Turntables

The ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1100 IVANHOE RD. CLEVELAND, OHIO, U. S. A.

give a range of control of the amount of backlash when assembling gears by small adjustments of the relative axial positions. It is equally desirable in the bevel gear field as well as in the spur to make full or large tooth layout when designing gears for a particular application both to obtain general appearance of the cross section of the tooth and to make gear and pinion of approximately equal strength."

B. F. Bregi, National Broach and Machine Co., supported gear shaving as a substitute for grinding to reduce time, scrap, and to utilize less skilled personnel. He pointed out that shaving was faster than hobbing, and suggested that if time and accuracy was of paramount importance hobbing time should be reduced and then followed by shaving. Two shaving operations often are carried out following hobbing, he said. Meeting objections of gear engineers who object to the slight burr on the outer diameter left by shaving, he said that work now was underway to overcome this.

G. E. Schmitter, Falk Corp., discussed improved results to be obtained by varying the tooth form of helical gears to meet specific applications.

Metal Trades Group Offered Postwar Plan For Returning Vets

Bolton Landing, N. Y.

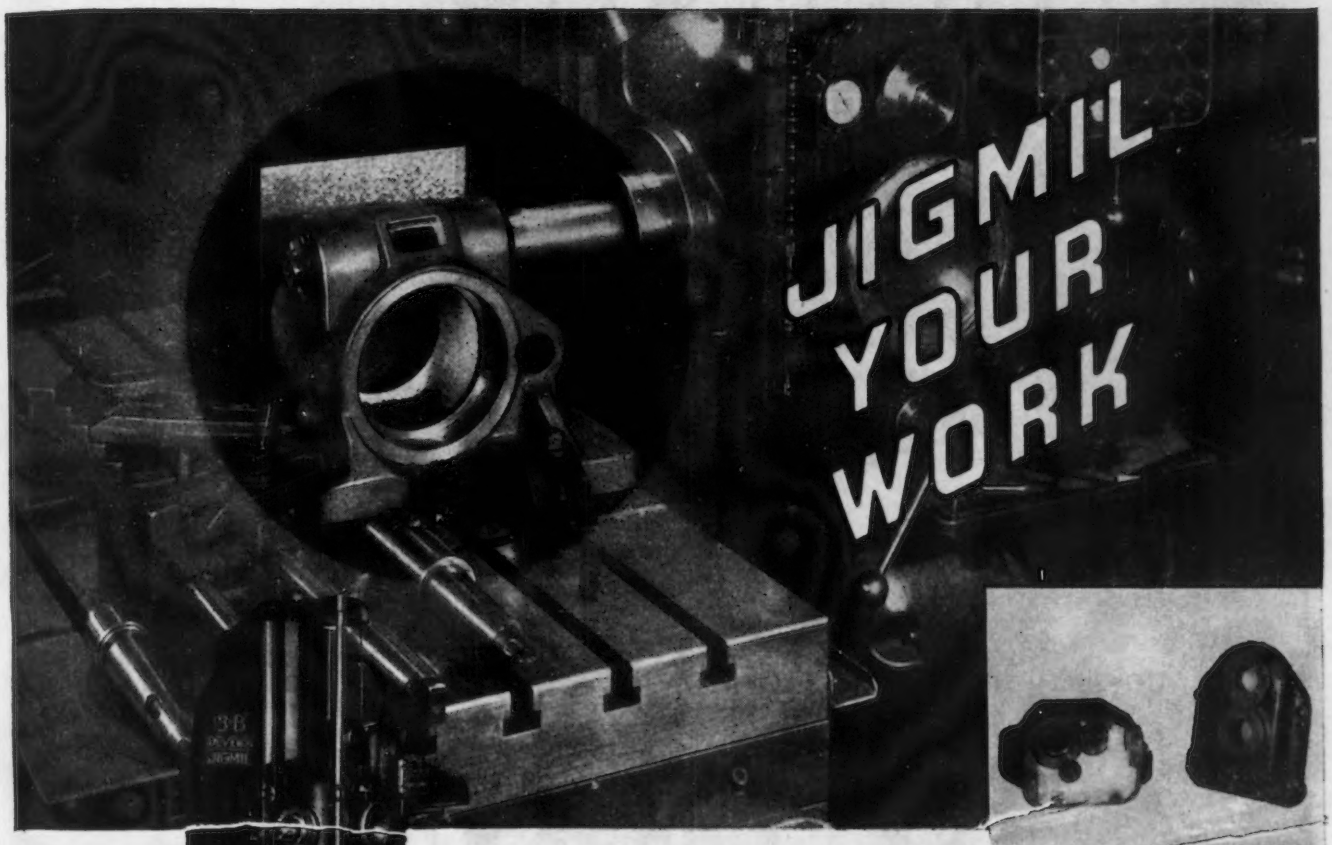
• • • **When GI Joe comes** back to his old job and his brother Jim, ex-war plant worker, knocks on the employment office door for work, industry in America faces a gigantic task of "fitting pegs, human pegs, into lifetime holes."

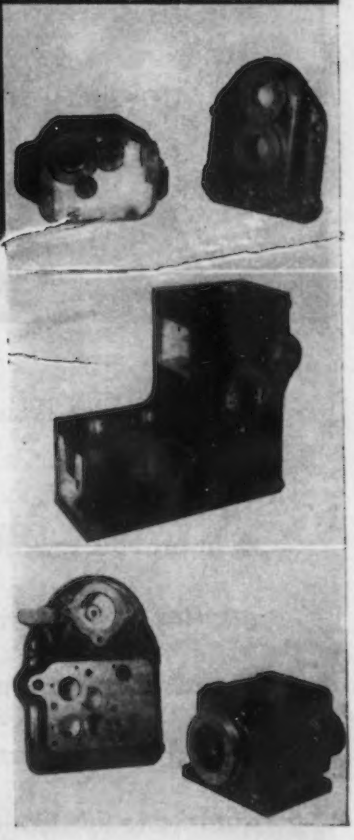
And the success with which it is done will measure the "speed and smoothness of transition from a war to peacetime economy," Jerome A. Gottschalk, Chicago research engineer, told the eastern Plant Management Conference of the National Metal Trades Assoc. here recently in a discussion of rehabilitating and reemploying servicemen.

The jobs are the holes and "without them the pegs cannot be placed," he said, but with proper cooperation of all, industry can hape to attain the high level of production in the post war era that will create the holes, which are the jobs.

"Industry itself," Mr. Gottschalk asserted, "has a function of fulfilling the economic needs of a community, and out of production itself grow jobs.

JIGMIL for Faster, Better and more Accurate BORING and Milling Performance





ARMY E NAVY

Two to three times faster than any other method.

Dependable accuracy and better finished holes than any other method.

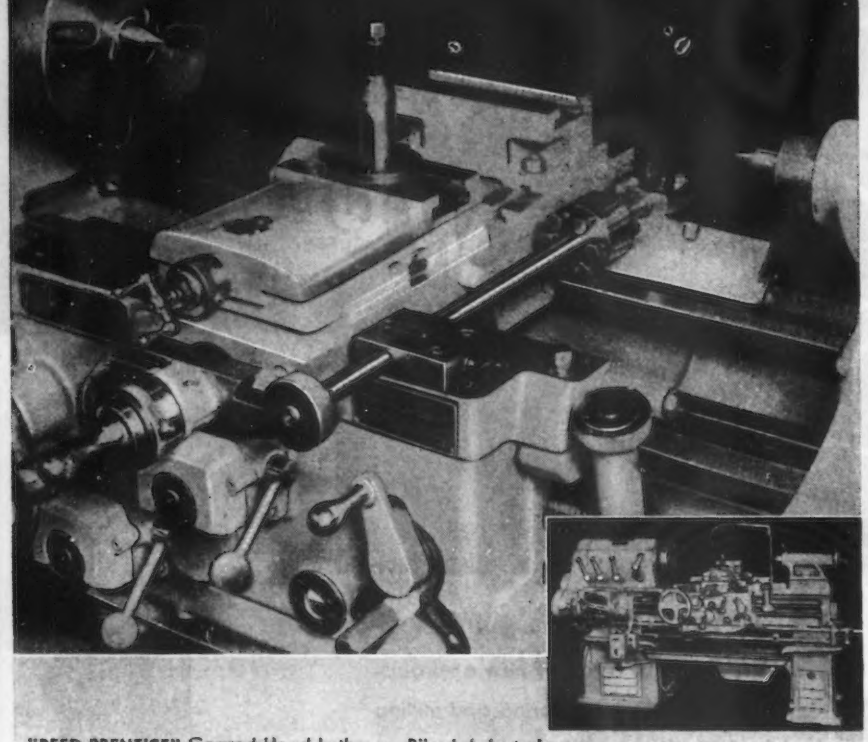
The JIGMIL is a totally new approach to the problems of boring and milling having dependable accuracy and ease of manipulation that eliminates the necessity for specialized skill.

The JIGMIL provides great economies on experimental and tool work.

The JIGMIL does most production boring and milling work faster and more accurately with rugged tools working in the open than is possible with the part trapped inside the walls of a boring fixture.

DeVLIEG MACHINE COMPANY DEVLIEG JIGMIL **450 FAIR AVE. FERNDALE 20, (Detroit) MICH.**

equipped for
VERSATILITY



"REED-PRENTICE" Geared Head Lathe . . . Bijur-Lubricated

● Improved machine versatility is demanded . . . greater capacity . . . closer accuracy . . . faster speeds. Modern machines must be adequately protected. More and more they rely upon correct, automatic lubrication—BIJUR "built-in" equipment.

BIJUR LUBRICATING CORPORATION · LONG ISLAND CITY, N. Y.

BIJUR
AUTOMATIC *Metered* LUBRICATION

industry does not exist to create jobs alone. Unless consumer markets are capable of utilizing the products of industry, the existence of jobs will be affected."

When 11,000,000 GI Joes return from the war and civilian workers in industries with reconversion problems begin to look for work, "all the ingenuity and resourcefulness which has characterized the American scene will be brought into play," the NMTA speaker said. "Many of them have been taught new methods of living and thinking; many have acquired new skills, developed new talents.

"The adjustment to normal living again must be as good as we can make it. Industry can best help in this effort by cooperation of all agencies interested in reaching a solution of this vital problem."

Individually, each industry—every firm, large or small—"must establish sound policies and procedures for the employment of veterans and displaced war workers," Mr. Gottschalk added.

"It must place the responsibility for carrying out such policies and procedures in some single unit or person within each organization, and cooperate with all agencies involved in the readjustment of these persons."

Mr. Gottschalk offered this four-point basic plan to guide individual firms.

"1. Establishment of sound procedures for the reception and interviewing of all potential employees.

"2. Complete analysis of the individual and the status of his abilities in order to reach maximum efficiency in matching the individual with the job.

"3. Study of each of its jobs or positions in order that a complete picture is presented, indicating the physical requirements, environmental conditions, and the hazards in relation to the job.

"4. Proper follow up on all individuals in jobs or positions to insure maximum employment."

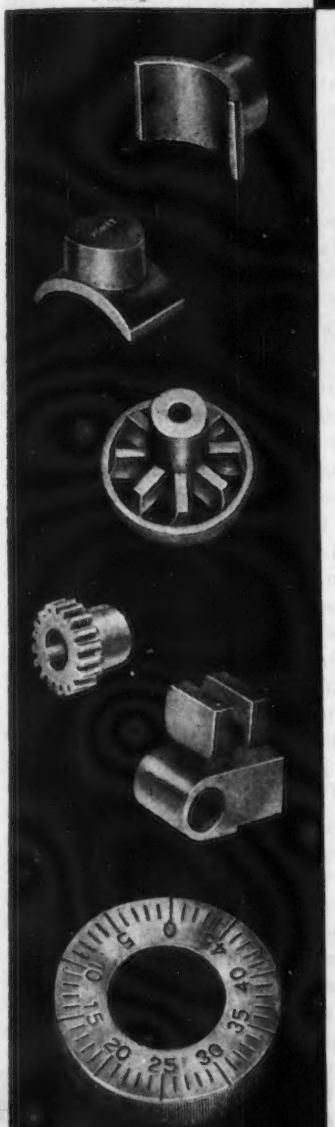
Revised Rules for Welding Piping in Marine Construction

• • • **"Rules for Fusion Welding** Piping in Marine Construction," first published by the American Welding Society in 1938, has now been revised to bring the original data for welding low carbon steel (0.35 per cent C max.) marine piping up to date.

Copies of the standard are available from the American Welding Society, 33 West 39th Street, New York 18, at 25c. each.

POMET POWDER METALLURGY

FROM POWDER TO PARTS WITH POMET



DON'T DECIDE UNTIL YOU SEE WHAT POMET CAN DO

THIS TEAMING UP OF PRECISION WITH VOLUME WILL INTEREST POST-WAR PRODUCT DESIGNERS

Combining quality with quantity in the fabrication of small metal parts has become habitual with Pomet technicians. Long experience in meeting rigid war-time requirements has lifted powder metallurgy to a new level of efficiency.

For specific applications, many parts of bronze, iron and other metals are being made in which high density, fine finish, close tolerances and the elimination of costly machining are attained.

Pomet produces parts of specified density with the same exactitude that you would expect in the control of porosity for oil-less bearings.

This war-inspired combination of precision, controlled characteristics and speed will have a definite bearing on peace-time profits. Many manufacturers, who are using Pomet facilities now, will look to them for the type of help they will soon need for the prompt production of better post-war products.

Recently expanded facilities now assure even greater production. We invite consultation from manufacturers who are interested in the quantity production of small parts to rigid specifications. You will find Pomet parts economical—particularly in quantities of 100,000 or more. We will be pleased to quote on blueprints or specifications or send you literature on request.

CLOSE TOLERANCES
WITHOUT MACHINING

HIGH DENSITY

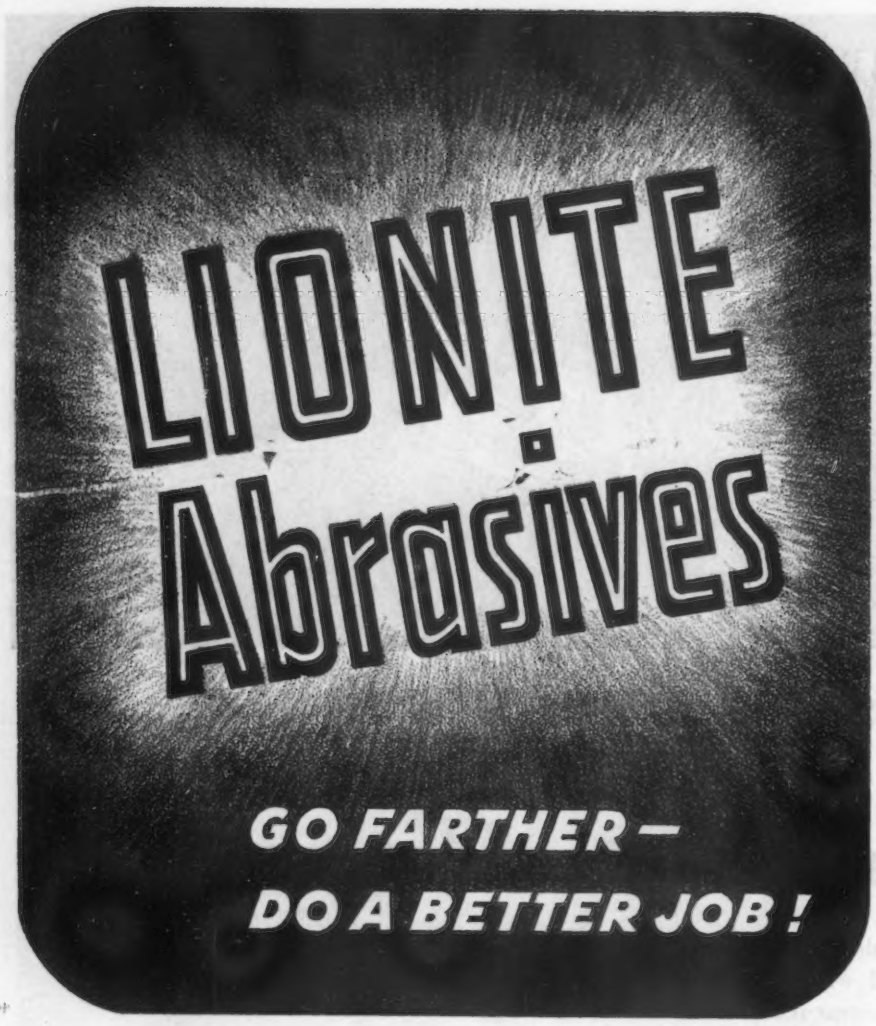
POMET

DUCTILITY OR HARDNESS
COMBINED MATERIALS
WEAR RESISTANCE

POWDER METALLURGY CORPORATION

A SUBSIDIARY OF GENERAL BRONZE CORPORATION

34-23 Tenth Street — Long Island City, N. Y.



From many successful tests run with LIONITE by our customers in recent months, we have selected two to show what LIONITE can do. These are two entirely different jobs run by two different companies—one using CBT LIONITE, the other NB LIONITE.

Job No. 1—Polishing discs and corn-planter runners.
Grain Used—Size 46 CBT LIONITE with glue.
Results—LIONITE wheels did from 90 to 130 pieces per wheel where grain formerly used did from 40 to 60 pieces.
Job No. 2—Polishing hammers.
Grain Used—Size 36 NB LIONITE with cement.
Results—LIONITE wheels lasted an average of 2¼ hours where wheels using another make of grain averaged only 1¼ hours.

It is results like these that make LIONITE the preferred abrasive grain with leaders in all branches of industry. All sizes of these tough, sharp, fast-cutting polishing grains are now available for prompt shipment from stock. Make your next order LIONITE.

GENERAL ABRASIVE COMPANY, INC.
LIONITE and CARBONITE Abrasive Grains
NIAGARA FALLS, N. Y., U. S. A.

Winners Announced In Postwar Planning Competition Contest

Cleveland

• • • **The sum of $4750 has** been given in awards to 15 Lincoln employees, winners in a postwar planning competition, according to J. F. Lincoln, president of The Lincoln Electric Co.

The announcement from the president of the Cleveland company, was made Sept. 1, two months after the close of the contest which ran from October, 1943, to July 1, 1944.

Top winner of the first prize of $1000 was Jim Nicholl, foreman of the Lincoln shipping department, with the company eleven years, who submitted a paper on a deep drawn, automatically welded steel container for export packing and shipping of electrodes. The new container would replace the present wooden box now being used. Nicholl's paper showed the general design and method of manufacturing the container, and estimated that the savings in export boxing costs and freight might run well over $25,000 per year.

One hundred sixty-one papers were submitted in the postwar planning competition for the purpose, as stated in the rules, "To gather all of the ideas of each employee to assist management in planning for the future."

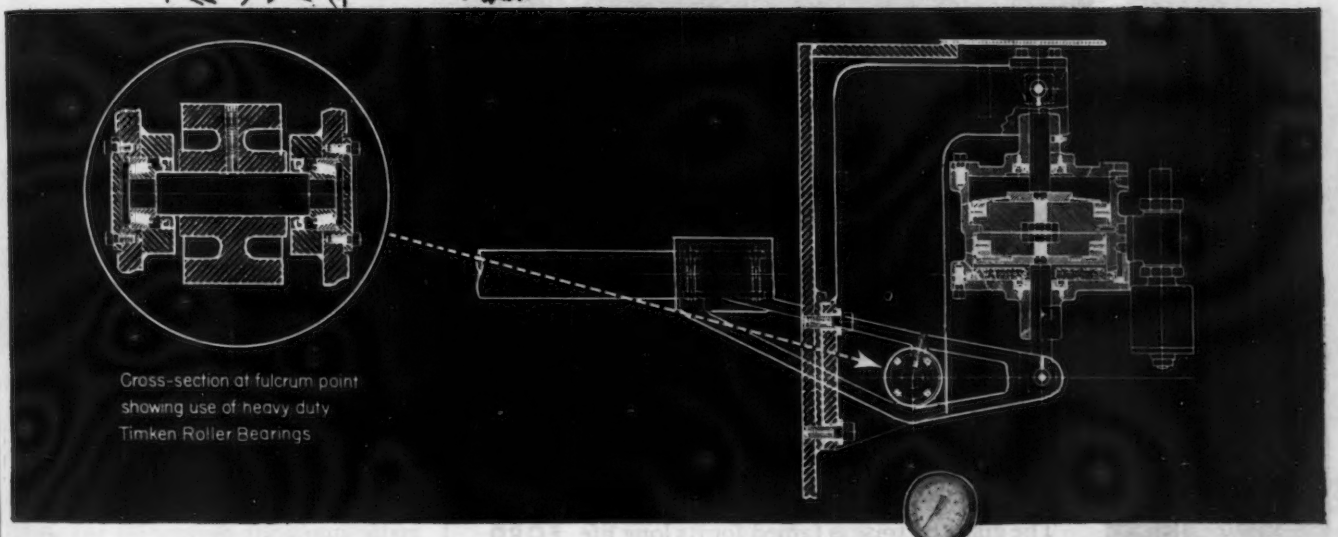
The idea for such a contest was submitted through the regular suggestion system by one of the factory men who received an award for the idea.

It was felt by everyone that the most important result of a competition such as this would be to get all Lincoln people to lift their minds and hearts above their daily routine tasks and look ahead company-wise to the future. The postwar papers the employees might submit could of course be very valuable as many of them were. The fact that the Lincoln men and women would know that their ideas were wanted and that the company would pay good hard cash for them also would be helpful. But above all else to have the entire sales and manufacturing personnel share with management the problem of what to do after the war, to have them appreciate the variety of conflicting paths ahead, these would be the most valuable results of the contest.

On July 1, at the close of the competition, the 161 papers submitted, identified only by a number, were col-

heavy duty *Roller Bearings* on this spotwelder mean:

* LESS MAINTENANCE
* SMOOTH ACTION
* NO SIDE PLAY

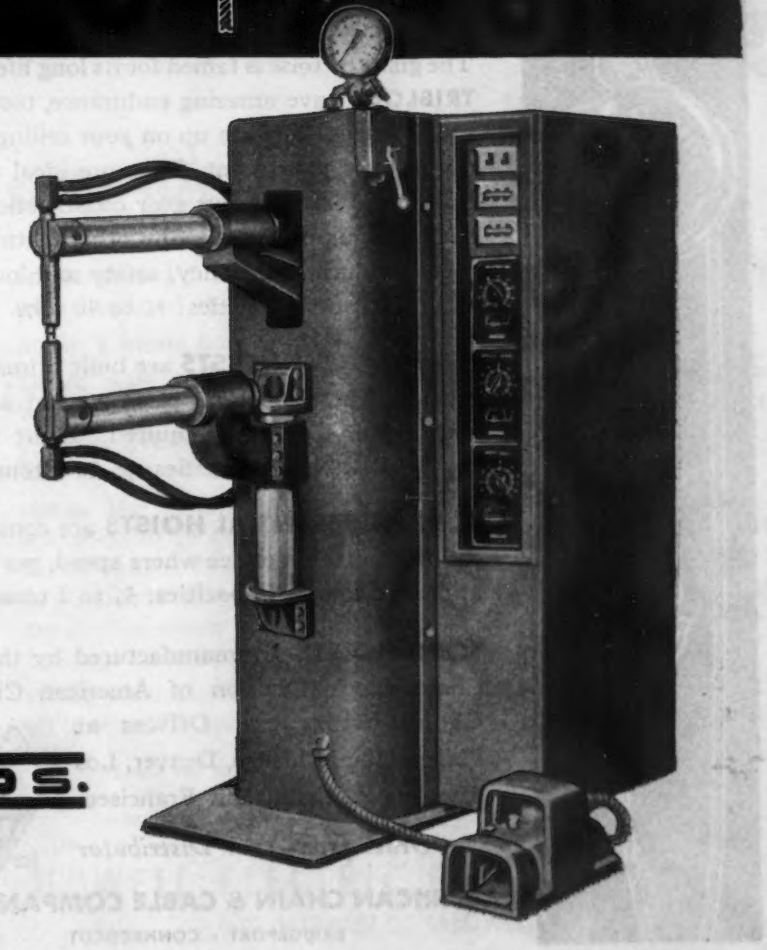


Cross-section at fulcrum point showing use of heavy duty Timken Roller Bearings

SCIAKY has built into this "small but mighty" rocker arm welder a wealth of features formerly only employed on heavy duty units. The result is a sturdy, accurate, fast machine, perfectly designed for the high quality production welding of light gauge metals.

Heavy duty Timken Roller Bearings at the fulcrum point eliminate wear . . . provide smooth action at maximum pressure. Rubber bumper within the pressure cylinder permits smooth return. Unit is entirely self-contained with controls mounted on a hinged cabinet, convenient to operator.

The machine, type PMCR.0-1 is rated 30 KVA at 100% duty cycle, 50 KVA at 50% duty cycle. Capacity on clean mild steel: up to two thicknesses of .080"; stainless steel up to .040". Speed on two thicknesses of .032" pickled mild steel is 180 spots per minute.



For a more detailed description, write for bulletin 112-A

SCIAKY BROS.

Manufacturers of a Complete Line of AC and DC Electric Resistance Welding Equipment

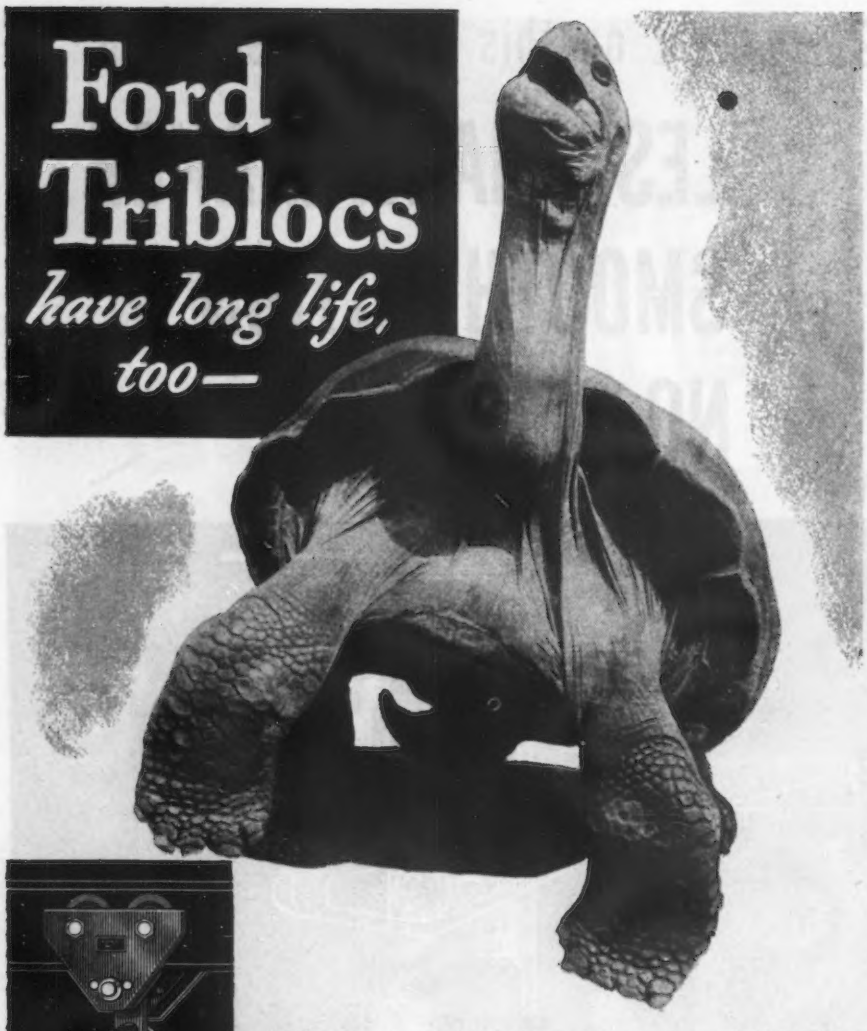
4915 West 67th Street, Chicago 38, Ill.

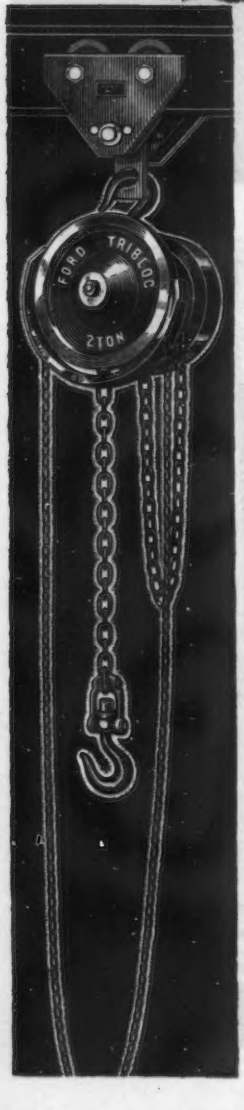
In England: Sciaky Electric Welding Machines, Ltd., London

Branch offices in Detroit and Los Angeles

Ford Triblocs

have long life, too—





The giant tortoise is famed for its long life. **FORD TRIBLOCS** have amazing endurance, too. Given proper care—they are up on your ceiling for the duration of your plant. They are ideal for constant hard usage. Spur gear construction, ball-bearing equipped, and many other features that assure enduring efficiency, safety and low maintenance cost. Capacities: ¼ to 40 tons.

FORD SCREW HOISTS are built primarily for jobs on which smooth operation and accurate spotting of loads are required. Light weight; highly portable. Capacities: ½ to 5 tons.

FORD DIFFERENTIAL HOISTS are constructed for intermittent service where speed, portability and price count. Capacities: ¼ to 2 tons.

FORD HOISTS are manufactured by the Ford Chain Block Division of American Chain & Cable, Bridgeport. Offices at Philadelphia, Chicago, Denver, Los Angeles, Portland, San Francisco.

Order from Your Distributor

AMERICAN CHAIN & CABLE COMPANY, INC.

BRIDGEPORT · CONNECTICUT

lected and turned over to a panel of five members of the operating executive committee of the company. This panel was composed of an executive from each of the engineering, welder manufacturing, electrode manufacturing, sales, and public relations divisions of the company. The papers were judged on their value to the company. The judges themselves did not know who the authors of the winning papers were until announced by Mr. Lincoln.

Of the fifteen prizes ranging from $1000 to $100, four of the prizes, including the first and the third, were won by men in the Lincoln factory, while the other eleven were awarded to the company's sales engineers in district offices all the way from San Francisco to New York.

Second prize of $750 was won by H. E. Cable, sales engineer from the Pittsburgh office, who through an engineering study outlined a method of sales-engineering research whereby several thousand automatic welders could be sold.

Third prize winner of $600 was D. J. Burke, maintenance department employee, for his design and suggestions for building a small positioning device to hold work in various positions while it is welded.

Papers on remote control and automatic stop start devices for use with Lincoln machines, a welded steel engine for engine driven welders, appearance improvements, and plans for making changes in the shop organization so as to have a six-hour working day accomplish as much as an eight, were among the other prize winning papers.

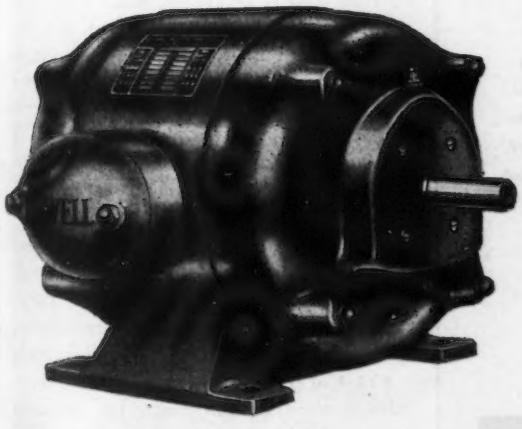
WLB Denies Wage Increase

Chicago

• • • **The Sixth Regional War** Labor Board has reaffirmed its action of May 5, 1944, in denying a proposed 5 cents an hour general wage increase to shop employees of Ceco Steel Products Co., Cicero, Ill. Workers were represented by the International Association of Bridge, Structural and Ornamental Iron Workers, local 473. Employees involved numbered 517. Labor members of the board dissented from the decision.

Labor members of the board also dissented from a decision involving the Macwhyte Co., Kenosha, Wis. On this decision, also, the board reaffirmed its previous stand, taken Feb. 21, 1944, which modified proposed increases. The company had petitioned for reconsideration, no union being involved.

Don't Be Fussin' and Fixin'— Get Horsepower by Howell



The Howell Protected Type Motor, shown, gives complete protection against dripping liquids, metal chips and other falling particles. Completely streamlined — utilizing non-breakable steel frame — malleable or steel base — cast iron end plates and cast iron, weatherproof terminal box are standard construction features. Special horizontal and vertical mountings are available.

Available in sizes 5 H.P. and smaller.

REPAIR MAN: I'd like to wrap this wrench around the guy's neck who insulated this motor.

HORSE: I know how you feel about sloppy work.

REPAIR MAN: Here we are at the peak of production, and what happens? Motor failure . . . tear down the machine . . . lose time . . . get behind — all because the motor wasn't built right in the first place.

HORSE: My good man, stop worrying! Use Howell Motors. The entire stator of every Howell Motor is triple-treated with Howell Bond varnish. It is made to withstand temperatures up to 350° F.— is water and oil proof and grease resisting, and it will not break or crack. The rotors are copper, too, and the best grade bronze or ball bearings are used. You just can't buy better motors.

REPAIR MAN: That's right! I know it! I'm specifyin' HOWELL for all my new jobs.

Phone the nearest Howell representative today, or write direct to the factory for prices, data and delivery dates on Howell standard or specialized motors for every industry, up to 150 Hp.

HOWELL ELECTRIC MOTORS COMPANY

HOWELL, MICHIGAN

Manufacturers of Quality Motors Since 1915

Aluminum STAMPED ON REGULAR DRAWING PRESSES

BY Parish

Multiple contour shapes are press-formed on Parish presses with a minimum number of draws. No creases or wrinkles to require peening. No impairment of metal structure. There is minimum metal waste because gripper room need not be allowed for. Production speed is multiplied with consequent lower costs. Whatever your parts problem, Parish pressed metal parts may help you get greater production of better, lower cost finished products. Parish is prepared to work with you from the initial design stage on through to the production and finishing of complete assemblies. Fully integrated, including departments for heat treating, X-ray inspection, welding, japanning or other finishing, Parish offers a unique service to American industry. Write today.

MODERN DESIGN AT LOW COST

Parish Pressed Steel Co.

Subsidiary of SPICER MFG. CORP., READING, PA.

Western Representative: F. Somers Peterson, 57 California St., San Francisco, Calif.

Cessation of the War Will Terminate Many Aircraft Contracts

New York

• • • The cessation of European hostilities will result in the termination of one-third of all aircraft industry contracts, Maj. Gen. Bennett E. Meyers, deputy director of materiel and services, Army Air Forces, told the 2700 Eastern aircraft contractors and subcontractors present at the one day forum on contract adjustment and termination held at the Waldorf-Astoria, New York, recently.

The task of contract termination, General Meyers said, is one of the most important war udertakings of the industry, second only to the continued production of needed fighting planes. Air force contracts already cancelled total approximately $6 billion, more than the total of all contracts terminated at the end of World War I.

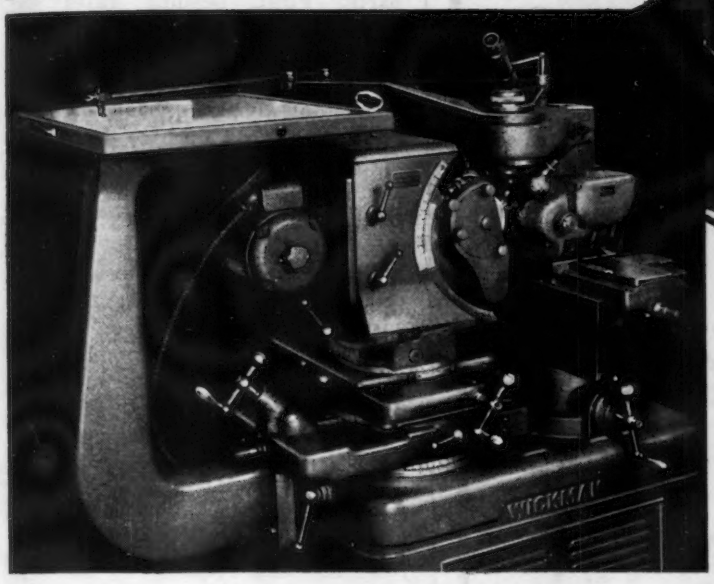
To assist in the tremendous liquidation program, the War Department has trained 4255 officers to help industry with problems arising from contract cancellations. Just as the War Department is choosing high caliber officers for work in contract terminations, so should industry select its best men for the task, General Meyers urged.

In opening the meeting, Robert A. Lovett, Assistant Secretary of War for Air, complimented the war record of the aircraft industry but emphasized the importance of the termination program. "The time for action in a program of reconversion has now arrived and it is urgent that both the manufacturer and government put its best men at work to bring about a healthy solution of this problem and at the same time keep industry healthy."

To effect fair and fast settlements of terminated contracts, Col. E. S. Fillsburgh, assistant chief of the Readjustment Division and chief, Termination Section, Materiel Command, Army Air Forces, Wright Field, Dayton, made the following recommendations:

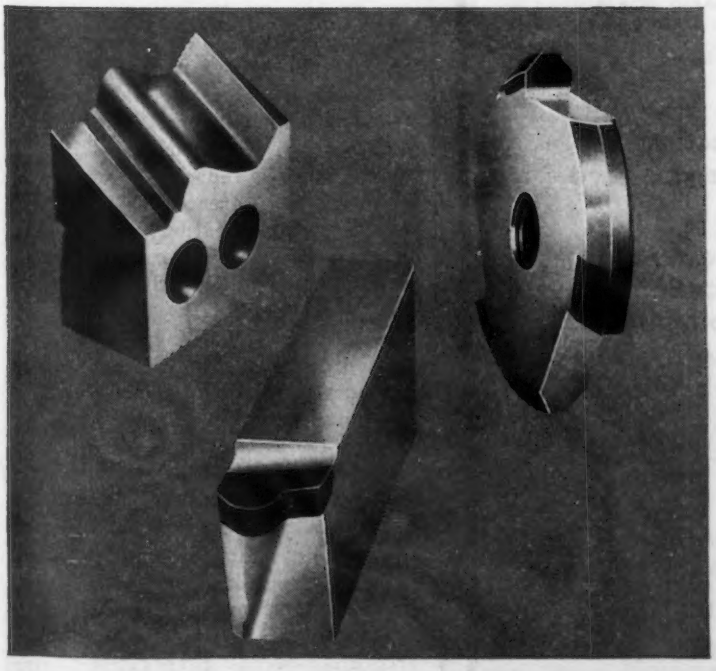
(1) Contractors should set up termination organizations to include some of the key personnel of the company. The best men in the United States are none too good to do this part of the job, the Army Air Forces believe. This organization should include over all directors, some negotiators, experienced accountants of the executive type and legal advisers.

Batteries of Wickman PRECISION PROFILE GRINDERS



AS MANY AS 22 AMERICAN-BUILT MACHINES NOW OPERATING IN ONE PLANT

Shown above is the Wickman Profile Grinder on which is mounted the circular grinding attachment supplied as an extra for use on cylindrical work such as circular form tools.



A true measure of the value of any machine tool can be found in the records of "repeat" orders. The Wickman Corporation customer list now shows a number of concerns who bought one Wickman Profile Grinder . . . and then placed orders for as many of these machines as were required to handle in their production all of the contour grinding work for which the Wickman machine is particularly suited. Every user has realized definite savings in both machining time and skilled manpower.

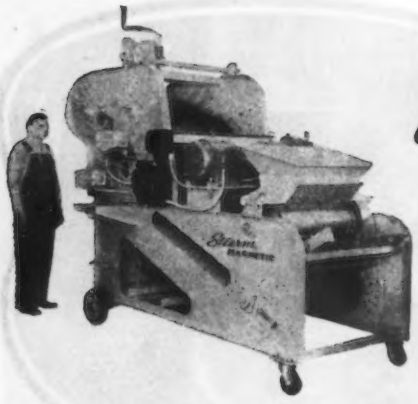
Shown at the left are three typical examples of work ground and inspected on the machine without use of radius dresser or formed wheel. While especially adaptable to cemented-carbide work, the grinding of contours in high speed steel as illustrated in the upper left is handled equally as efficiently.

FULL INFORMATION IS YOURS FOR THE ASKING

BUY WAR BONDS

THE Wickman CORPORATION

15537 WOODROW WILSON AVE.
DETROIT 3, MICHIGAN



Stearns MAGNETIC
PULLEY SEPARATORS
for conserving
Scrap Metals

Separating brass or aluminum from iron turnings and borings in large capacity operations is most economically accomplished with Stearns Magnetic Pulleys or Pulley Type Separators.

Shown above is a double pulley separator installed in a large Eastern smelting plant, a unit easy to adjust, easy to load, readily moved about where needed—another of the many uses industry has found for lowering production costs — increasing the value of and conserving scrap metals.

Whether it be for protection against tramp iron in crushing or pulverizing . . . concentration . . . reclamations . . . separation — Stearns Magnetic Pulleys will provide maximum efficient trouble free service.

THE STEARNS POWERFUL
AIR-COOLED MAGNETIC PULLEY

The wide acceptance of Stearns Magnetic Pulleys, prestige earned in satisfactory service for industry, is the result of progressive better engineering.

For efficient, economical and automatic separation, concentration, purification or reclamation there is a size to fit your needs, readily installed in your conveying system. Available also in self contained, mobile units.

COMPLETE DATA IN BULLETIN 302.
WRITE FOR IT.

MAGNETIC
SEPARATORS
DRUMS
BRAKES, CLUTCHES

Stearns MAGNETIC MFG. CO.

635 So. 28th St.
Milwaukee 4, Wis.

NEWS OF INDUSTRY

This job takes the best judgment the industry can produce.

(2) Termination personnel should study and live with the government rules of termination. PR 15 is the Bible of cancellation procedures. Familiarity with the rules is essential.

(3) The problem of contract cancellations should be divided into two parts: First, pending cases and, second, plans to handle the avalanche of termination when the day comes.

(4) Large corporations having a number of divisions should decentralize authority as much as possible.

(5) Contractors must try to get along with the rules as they are now established and as they will be amended.

All speakers at this forum urged prime contractors to file their claims with more speed. Figures on the time required to settle terminated contracts by the War Department and the time taken by prime contractors in presenting their claims were disclosed by Charlton MacVeagh, deputy director, Readjustment Division, Headquarters, Army Service Forces, Washington. In the first half of this year, the time required by the War Department to settle contracts was reduced from 2.5 months to 2.4 months while the time taken to file claims rose from 2.6 months to 2.9 months. Although the record of the Army Air Forces was a little lower than for the entire War Department as a whole, Mr. MacVeagh added, AAF's settlements were being accomplished more rapidly. Prime aircraft manufacturers, however, were taking longer in filing claims, from 3.3 months to 4.6 months. This backlog of unfiled claims must be reduced, he said.

To bring a greater uniformity to contract termination procedures, claim and inventory forms will be issued shortly which will be identical for all procurement agencies.

Aircraft contractors must approach contract termination with "all the energy and enthusiasm shown in the building of the nation's great air fleets," Lt. Gen. William S. Knudsen urged. However, he reminded his audience that the war is not yet over and will not be "until I am so told by General Marshall and Admiral King."

To train contractor personnel on the practical working methods and procedures of contract termination, property disposal and preparation of required forms, the Army Air Forces in the Eastern Procurement District will conduct readjustment training courses. The first of these courses were held Sept. 6 and 7 in New York.

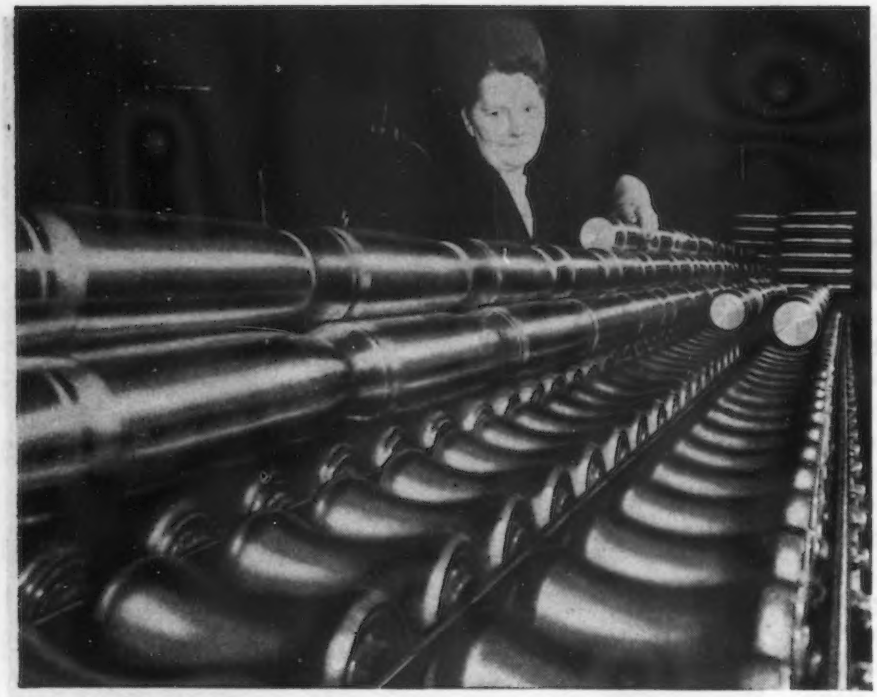
Revolutionary Rockets!

Authorities predict that aircraft designs of tomorrow will be of the advanced rocket type. The new rocket models will permit much higher speeds at much higher altitudes. Thus new developments which require light alloys keep opening up avenues for improved products. The Bohn organization is one of the world's largest and leading specialists in the engineering and fabrication of aluminum, magnesium and brass products. When peace comes, Bohn metallurgists and engineers should be helpful to you in designing your products for tomorrow.

BUY WAR BONDS

BOHN

BOHN ALUMINUM AND BRASS CORPORATION
GENERAL OFFICES — LAFAYETTE BUILDING, DETROIT 26, MICH.
Designers and Fabricators
ALUMINUM • MAGNESIUM • BRASS • AIRCRAFT-TYPE BEARINGS



Making Women's Work Easier *and Safer*

Manufacturers are continuously striving to improve working conditions in their plants, and especially those conditions which affect women workers. As a result of this effort, there has been a definite decrease in the lifting and shifting of heavy materials, pushing and reaching, and similar tiring, energy-wasting activity. Mathews Engineers have helped to promote this decrease through the application of modern conveyer engineering; gravity and power conveyers which handle work to and away from machines with a minimum of manual effort required by the operators; special lift mechanisms, transfers, and turntables which enable the operators to get the work into and out of machines easily and safely, and numerous other conveyer types and special devices designed to save time and serve labor. Mathews Engineering service is available in all industrial centers in the United States and Canada.

Mathews Conveyer Company

ELLWOOD CITY, PENNSYLVANIA

Carnegie-Illinois Has Re-employed 4000 War Veterans

Chicago

• • • **Carnegie-Illinois Steel Corp.**, major subsidiary of the United States Steel Corp., already has re-employed more than 4000 veterans of World War II, J. L. Perry, president of the company, told leaders of the Hoosier State Chamber of Commerce at a dinner meeting here recently.

Perry added that over 2000 of the veterans re-employed are former Carnegie-Illinois employees who served with the armed forces while on leave of absence.

"Forty-three thousand Carnegie-Illinois employees have gone into the armed services since Pearl Harbor," Perry said. "Replacement of such a large number, who held experience and skills we could ill afford to lose, has meant recruiting and replacing work of no mean proportion; yet the plants maintained their production and facilities, and in some cases the working force was expanded.

"It is not known how many of the former employees now serving in the armed forces will return. Of course, it is our wish that all of them return and that all of them who do return will want to return to employment with our company. We have a well-defined and comprehensive re-employment policy. The implementation of this policy is regarded by all supervisors of the company as one of the most, if not the most, important duties they have."

Perry pointed with pride to the fact that today there are more than 15,000 women working in Carnegie-Illinois plants alone, with 11,000 of them engaged in 360 different operating jobs. He said that employment of women had required new training programs to qualify them for a variety of skilled and unskilled jobs. He added that, of course, streamlined yet efficient training also had been required to qualify the "butcher, baker and candlestick maker" for war work.

"In the midst of all this development, production continued and records were broken month by month," Perry said.

"As a part of the steel industry," he continued, "Carnegie-Illinois has a high percentage of total ingot capacity. We view this capacity, however, which would be available in peacetime use, with the same patriotic consideration we accorded it when every effort

it started something!

When this train stopped, way back in '69, it started a train of events that vitally affects our lives today, and is helping to shape the world of tomorrow.

The train was the Steubenville Accommodation, first in the world to be equipped with the new Westinghouse Air Brakes. It was rolling at 30 miles per hour when the engineer saw, directly ahead, a dray stalled on a crossing.

Then history was made. The engineer moved the brake lever to emergency. Brakes squealed, passengers sprawled on the floor, and the train ground to a stop, inches away from the dray. This dramatic demonstration won immediate acceptance of the new brake.

Without the air brake, today's transportation miracles would be impossible. Trains can *go* faster . . . because they can be stopped faster. But the contribution of air control merely begins there. It is governing the entire cycle of engine maneuvering on fighting craft. It is controlling the handling of materials, the operation of well drilling rigs, road building machinery, and doing dozens of other jobs . . . and the surface of its possibilities has not been scratched.

In any thinking about improvements in products or production, give W-A-B Controls a place in your planning.

Westinghouse Air Brake Company

INDUSTRIAL DIVISION

General Offices: Wilmerding, Pa.

75 Years of Pioneering

1869 1944

W·A·B

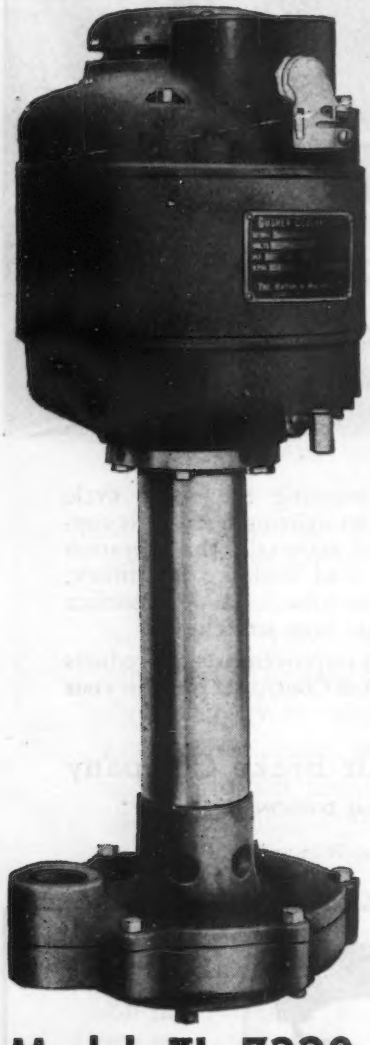
Pneumatic · Pneumatic Electric · Pneumatic Hydraulic

remote control systems

from SMALL to LARGE!

Whatever your special coolant needs, they are met by

GUSHER
COOLANT PUMPS



One of the big advantages of Gusher Pumps, besides their simple design and rugged construction, is their flexibility of use, giving anything from 200 gallons per minute to the tiniest trickle since they can be throttled (according to type and size) to produce any desired flow *without injury to the pump and without overloading motor.*

The multiplicity of types and sizes available makes it easy to fit your special coolant needs. Universally accepted by leading machine-tool designers and builders, Gusher Pumps are built for steady, continuous performance and hard-usage service. Investigate. The record speaks for itself.

Write for catalogue

Model TL-7320

See Section 2 of new catalogue indexed for quick reference.

Gusher Pumps—Patented and Patents Pending

THE RUTHMAN MACHINERY CO.

1821 READING ROAD CINCINNATI 2, OHIO

THE "GUSHER"—A MODERN PUMP FOR MODERN MACHINE TOOLS

was made to give the nation the tonnage it sorely needed in its critical hour. Fortunately, this capacity is fortified with an ample supply of all necessary raw materials, and with the re-induction of the returning veterans there will be available the largest number of skilled mechanics and technicians the nation has ever had. But on the other side of the ledger there probably will be a great pent-up demand for a great variety of commodities, with accumulated savings available—more than ever before—for the purpose of these deferred requirements.

"When peace comes, Carnegie-Illinois will assume its trade position fortified with all of the 'know-how' that has been evident in our war production."

Perry said the Gary plants will take as important a part in peacetime production as they have in furnishing materials for the armed services. He said the Gary plants were built in Indiana many years ago because of tremendous increase in the demand for steel in the area.

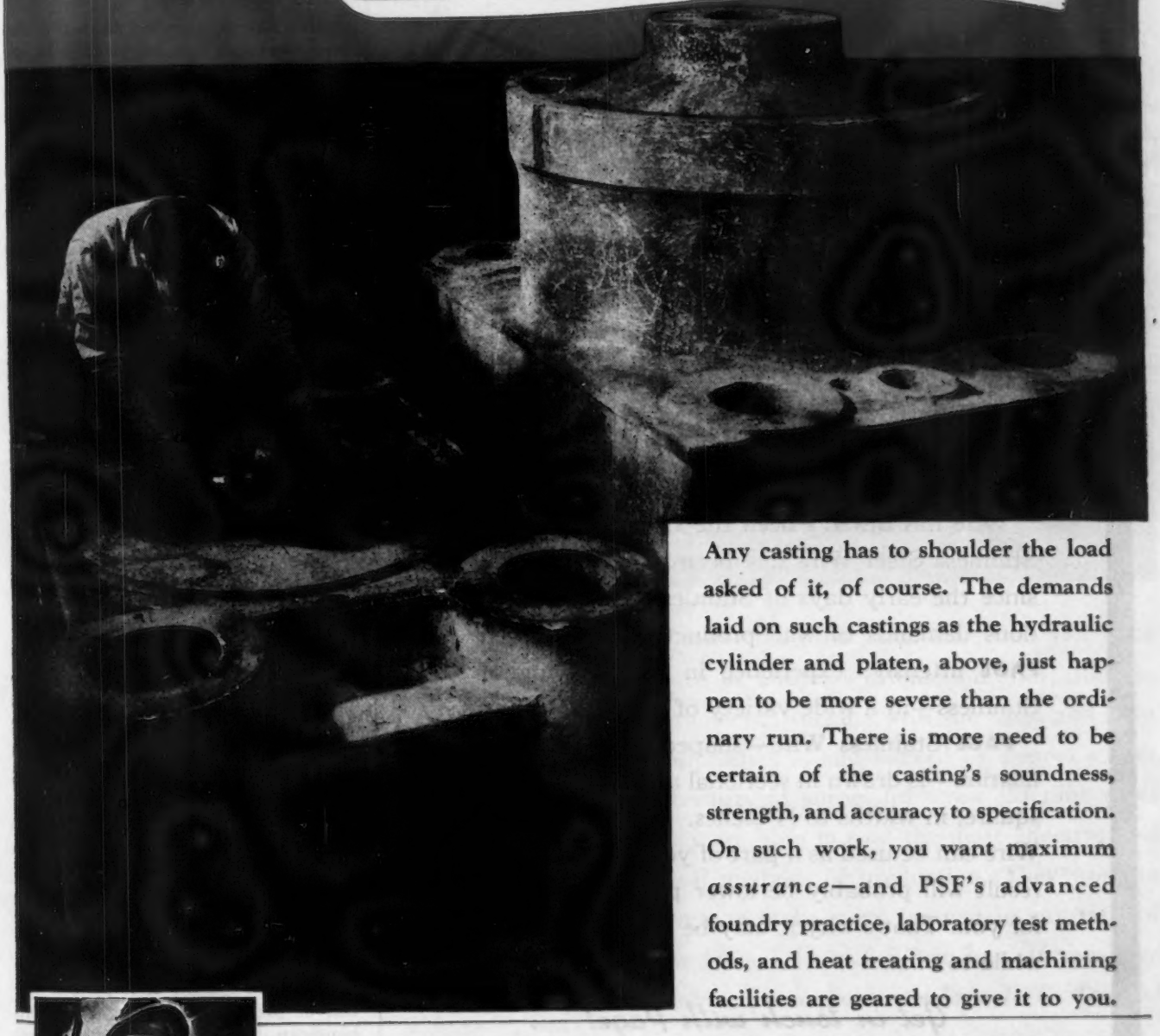
"The steel industry recognizes the responsibility to Indiana by reason of its employment of more people than any other industry in the state," Perry declared. "This company's two Gary plants alone employ more than 27,000 men and women. To keep these people in continuous employment depends upon the demand of the steel consumers and the ability to sell steel at a profit. To do this, means that the items that control the margin of competitive profit must be carefully watched and the burden kept to a minimum."

Norton Acquires Bura-way Unit

Worcester, Mass.

• • • **Norton Co.**, builders of grinding and lapping machines, has acquired all design and mechanism patents, copyrights and all manufacturing and sales rights pertaining to the Bura-way grinder, originally held by the James Donaldson Co., New York. This precision form tool grinder, which incorporates the unique principle of grinding single point tools with constant relief in the direction of feed, has been built by the Norton Co. on a contract basis since it was first introduced some three years ago. Walter Bura, the inventor, is not joining the Norton staff. The machine, which is built to jig borer accuracy, will be sold under the name of Norton Bura-way.

PRESSURE CASTINGS FOR HYDRAULIC WORK HAVE TO BE *dependable*



Any casting has to shoulder the load asked of it, of course. The demands laid on such castings as the hydraulic cylinder and platen, above, just happen to be more severe than the ordinary run. There is more need to be certain of the casting's soundness, strength, and accuracy to specification. On such work, you want maximum *assurance*—and PSF's advanced foundry practice, laboratory test methods, and heat treating and machining facilities are geared to give it to you.

W&D 9490

46 YEARS OF STEEL CASTING KNOWLEDGE

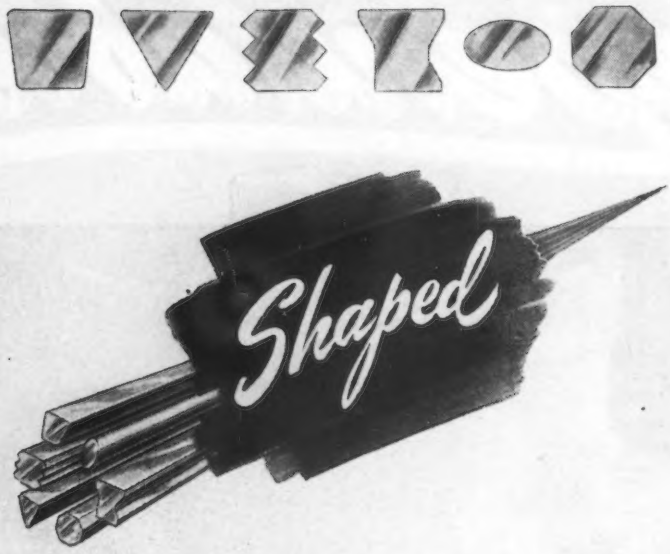
Pittsburgh

STEEL FOUNDRY CORPORATION

GLASSPORT, PA.

Sales Offices: NEW YORK • PHILADELPHIA • WASHINGTON AND CHICAGO

PAGE Stainless Steel WIRE



● If there is a way for you to trim production costs by using Shaped Stainless Steel Wire, **PAGE** can help you find the way.

Wire has *always* been the business of **PAGE**. Stainless Steel Wire has been a **PAGE** product since the early days of Stainless. And tremendous demands of war production have given **PAGE** intensive experience in the drawing of Stainless—in a wide variety of shapes.

PAGE Stainless Wire—shaped to your specification—is drawn in sectional areas up to .250" square, in widths to ⅜ inches. If **PAGE** Shaped Wire can be used as a part of your product, the result will probably be lower production costs for you. That's why it may be well worth your while to . . .

Get in touch with Page!

PAGE STEEL AND WIRE DIVISION

Monessen, Pa., Atlanta, Chicago, Denver, Los Angeles, New York, Pittsburgh, Portland, San Francisco

In Business for Your Safety

AMERICAN CHAIN & CABLE COMPANY, Inc.
BRIDGEPORT • CONNECTICUT

Urges Industry To Act Now on Postwar Veteran Employment

San Francisco

• • • **American industry** should take action now to gear itself for full postwar employment of the disabled American war veteran, R. S. Rheem, president of the Rheem Mfg. Co., declared here recently.

Mr. Rheem asserted that the disabled veteran can be fitted into the pattern of American production after the war, not as a recipient of charity, but as a full fledged worker at proper wages. The secret, he said, is to fit the machines to the men and women and not the men and women to the machines.

The Rheem company has already embarked on a program designed to provide jobs for disabled veterans. A full study, just completed at the company's South Gate, Cal., plant, Mr. Rheem said, showed that 51 per cent of its total positions could be filled by handicapped persons. He revealed that similar studies are now being made in all Rheem plants.

Included in the occupations available for handicapped veterans as disclosed by the South Gate study are jobs for one-armed workers, workers with partial limitation in one hand, one-legged workers, blind workers, deaf mutes, workers with nervous instability or poor coordination, sensitive skin or respiratory ills.

"The disabled war veteran," said Mr. Rheem, "is entitled to be fitted into the pattern of American production. American industry, by preparing now, can see that he does fit in.

"Returning disabled veterans, those with a physical disability or handicap, or with any degree of mental disability must have very special understanding and careful handling for the sake of themselves as well as for industry. But there should be no hint to the handicapped veteran that he is a special or problem case because of his handicap. The veteran will resent being made the recipient of 'charitable' employment.

"Re-employment must be at a job on which the man's handicap has nothing or extremely little to do with his efficiency and safety as a worker. The veteran must be reassured that his handicaps are incidental and relatively minor facts in his ability to do a good job, and, of course, this must be true of the job in fact.

"The studies being made in the

Precision IS THEIR BUSINESS!

They make your screw machine parts *exactly* as you want them—these men of Tourek's Production Staff! Rich in years of experience... working with the latest and most complete equipment . . . and backed by Tourek's near quarter century of successful screw machine parts manufacturing, they are able to find the most effective and economical methods of production. They work to your blueprints to make parts for you in any type of metal, in any size from 1/16 to 2-5/8 inches. If you have a screw machine parts problem—*Take It To Tourek!*

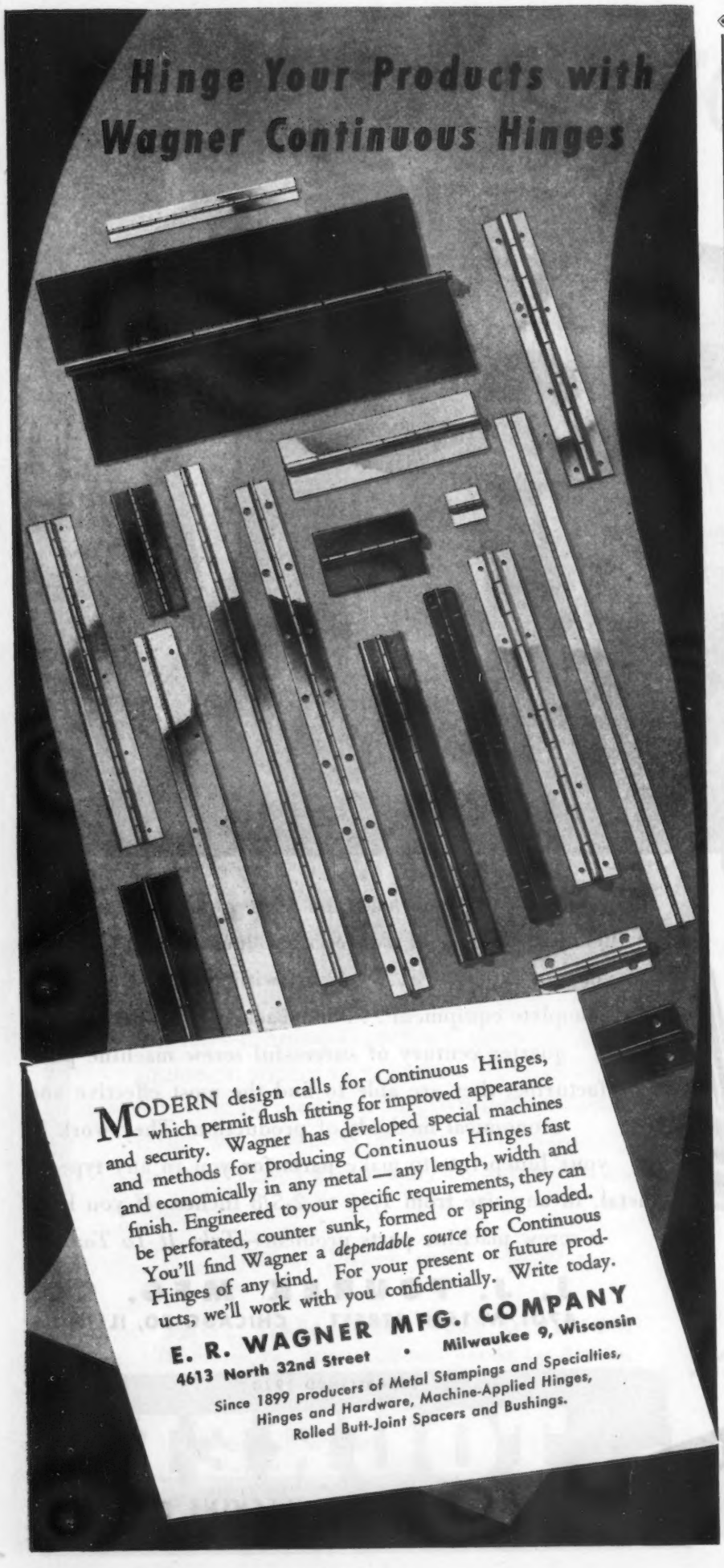
J. J. TOUREK MFG. CO.
4701 W. 16TH STREET CHICAGO 50, ILLINOIS

MAKERS OF THE FAMOUS TOUREK BALL JOINTS

ESTABLISHED 1920

TOUREK

PRECISION SCREW MACHINE PARTS


Hinge Your Products with
Wagner Continuous Hinges
MODERN design calls for Continuous Hinges, which permit flush fitting for improved appearance and security. Wagner has developed special machines and methods for producing Continuous Hinges fast and economically in any metal — any length, width and finish. Engineered to your specific requirements, they can be perforated, counter sunk, formed or spring loaded. You'll find Wagner a dependable source for Continuous Hinges of any kind. For your present or future products, we'll work with you confidentially. Write today.
E. R. WAGNER MFG. COMPANY
4613 North 32nd Street • Milwaukee 9, Wisconsin
Since 1899 producers of Metal Stampings and Specialties, Hinges and Hardware, Machine-Applied Hinges, Rolled Butt-Joint Spacers and Bushings.

Rheem plants provide for a complete analysis of every job in the plant to determine which jobs can be done by a man with one arm, for example, or a man with one leg, or with partial or no sight. Could a foot treadle be substituted for a hand lever to suit a one-armed man? Could the operator be seated rather than stand? Could a man with partial deafness be used, and where? What jobs could be done with a worker with one eye?

"The study in our South Gate plant revealed startling job possibilities for disabled veterans. In fact, the South Gate plant study showed that fifty-one per cent of all the jobs there could be handled by persons with physical handicaps, provided the proper steps were taken."

Closer Relations Are AFA's Immediate Goal

Chicago

• • • **Establishment of closer** relations between the national organization and local chapters of the American Foundrymen's Association was the aim of the first annual chapter contact conference of the society held here recently.

Twenty-seven newly elected officers of chapters met with national officials with the aim of coordinating efforts in carrying on activities of importance to the foundry industry. One of the major subjects discussed involved methods of interesting the students of engineering schools and colleges, trade schools and high schools to take up foundry work as a career. Chapter Officers were urged to give the question of its future supply of manpower more thought, even to the extent of creating interest in boys prior to their entering the high schools.

F. G. Sefing described briefly some of the work of the association's committee on cooperation with engineering schools and colleges and presented some suggestions offered by school faculties on furthering the interest of their students in the foundry field. These suggestions included: visits by foundrymen to the schools, lectures by prominent foundrymen before graduating classes, consulting with the faculties for betterment of foundry courses, offering scholarships at engineering schools, turning over foundry research projects to the schools for study, and contacting graduating engineers for the purpose of offering them foundry employment.

Marvels of Electronics—

and the steelmaking skill of Follansbee

Many of the electrical and electronic devices which are providing a margin of superiority to our fighting men are necessarily closely guarded military secrets. But it is no secret that their manufacture requires new standards in the production of Electrical Sheets.

The need for such combinations in high silicon steels as thin sheets to close gauge tolerances, exceptionally clean surfaces and excellent punching qualities, together with essential magnetic characteristics, created problems never before encountered in the tonnage production of Electrical Sheets.

The success of Follansbee in quickly meeting these new standards is evidence of the skill of its compact, highly trained organization. It is an important reason why you can entrust these and other difficult steelmaking jobs to Follansbee.

FOLLANSBEE STEEL CORPORATION

GENERAL OFFICES • PITTSBURGH 30, PA.

Sales Offices—New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee. *Sales Agents*—Chicago, Indianapolis, St. Louis, Nashville, Los Angeles, San Francisco, Seattle; Toronto and Montreal, Can. *Plants*—Follansbee, W. Va. and Toronto, O.

ALLOY BLOOMS, BILLETS, BARS, SHEETS & STRIP • COLD ROLLED SHEETS & STRIP
POLISHED BLUE SHEETS • ELECTRICAL SHEETS & STRIP • SEAMLESS TERNE ROLL ROOFING

Toss that
EXTRA TOUGH
DIE PROBLEM
In OUR lap

Using Strenes Metal, we'll cast your dies to shape, (usually to 1/16") and save you around 50% to 75% on machinery time. What's more you'll put to work a die that will stand up—draw and form far more stampings than you probably believe possible. Deep draw runs of 1,000,000 and more parts a matter of record.

You'll be using a die that will require redressing far less frequently than dies of ordinary metal. Sounds good, but, hard to believe, you say! Perhaps. But our suggestion stands "Toss us that tough one" and pay for it when Strenes makes good as claimed—otherwise there will be no charge.

THE ADVANCE FOUNDRY CO.
100 Seminary Ave.,
Dayton 3, Ohio

Refrigerators
Stoves
★ Automobiles
★ Trucks
★ Tractors
Metallic Vaults
Metallic Caskets
Farm Equipment
Fans, Blowers
Bicycles, etc.
★ In automotive field in general use for drawing and forming car bodies, hoods, fenders, head lights, radiator shells.

Strenes
METAL
DRAWING AND
FORMING DIES

WPB Discusses Cutbacks In Copper and Aluminum Production

Washington

• • • **Cutbacks in copper** and aluminum production and the problem of disposition of output arising from wartime expansion were discussed at recent WPB meetings.

Revocation of copper conservation order M-9-c upon the collapse of Germany was indicated at a meeting the Copper Division held with the Brass Mill Industry Committee, at which it was announced that a preliminary check showed an all-time monthly production record of 94,000,000 lb. of brass rods was made in August.

Members of the newly formed Aluminum Industry Committee were told that despite recent curtailment in production, the output of aluminum, due to wartime facilities expansion remains many times greater than peacetime production. Use of more aluminum in all types of production was urged by WPB officials who said that unless large new uses for the material are found the supply will continue to exceed demands.

The plant expansion program for copper and copper products, the record indicates, is well ahead of schedule, the Brass Mill Advisory Committee was told. Output of all other brass mill products was said to be in balance with WPB production schedules.

While pointing to the prospective revocation of the copper order, WPB said that necessary controls will be maintained to give precedence to military orders and each brass mill will be expected to take care of other requirements of all consumers on an equitable basis.

Everything from baby carriages to railroad box cars were suggested by a WPB official as civilian products that can be successfully made from aluminum. Corrugated sidings, shingles, cast radiators, window frames, venetian blinds, furniture truck and trailer bodies, lawn mowers, garbage cans and pails, slide fasteners, irrigation tubings and metal moldings were included in the list of potential products that can be manufactured for civilian consumption from aluminum, and as a result relieve demands for more critical materials, WPB representatives said.

No large increase in orders for aluminum for fabricating civilian products has been reported by industry members since WPB relaxed restrictions on the metal, committee members said. This is due to existing manpower controls, they indicated. Industry members suggested that producers of civilian products be allowed to purchase aluminum for inventory now. If manufacturers have aluminum on hand when manpower controls are eased, the reconversion period will be shortened, they said.

Disposal of government-owned plants was discussed. Industry members suggested that idle plants be kept in "stand-by" condition until Congress decides how to dispose of them. WPB officials suggested that producers of aluminum products continue to segregate scrap on a voluntary basis, even after WPB orders making segregation mandatory have been lifted.

Members of the new committee are: C. J. Amick, Century Metalcraft Co., Los Angeles; I. T. Bennet, Revere Copper & Brass Co., Baltimore; L. M. Brile, Fairmont Aluminum Co., Fairmont, W. Va.; Archie Cochran, Cochran Foil Co., Louisville, Ky.; S. D. Den Uyl, Bohn Aluminum & Brass Co., Detroit; J. G. G. Frost, Aluminum & Magnesium, Inc., Sandusky, Ohio; J. G. Landrigan, United Wire & Supply Co., Providence, R. I.; J. N. Pomeroy, General Smelting Co., Philadelphia; R. S. Reynolds, Reynolds Metals Co., Richmond, Va.; L. W. Wilson, Aluminum Co. of America, Pittsburgh; Roy Wilson, Advance Aluminum Castings, Chicago; George N. Wright, The John Harsch Bronze and Foundry Co., Cleveland.

Blaw-Knox Builds Five Synthetic Rubber Pilot Plants

Pittsburgh

• • • **Five synthetic rubber** pilot plants are now under construction for leading rubber companies and are expected to reach completion early in 1945, it was announced by the Blaw-Knox Co., designers and engineer-contractors of the projects.

Plants are being built for Firestone Tire & Rubber Co., Akron; Goodyear Tire & Rubber Co., Akron; United States Rubber Co., Naugatuck, Conn.; Copolymer Corp., Baton Rouge, La.; and National Synthetic Rubber Co., Louisville, Ky.

OFFICIAL U. S. NAVY PHOTOGRAPH

NIGHT ATTACK--

Machining a 5-inch, 38-caliber Naval anti-aircraft gun base.

Calls for even Greater Accuracy

When enemy planes dive from the moonless sky, the accuracy of men and guns is tested to their limit. American anti-aircraft guns are meeting this test in battle after battle . . . proving again and again the strength of their weldments and the precision of their machining.

Danly is proud to be among the outstanding steel fabrication firms chosen by the Navy for this precision welding and machining. These Navy weldments and other vital wartime fabrication jobs are adding to the store of Danly know-how, for better service when vastly increased facilities become available to industry.

DANLY MACHINE SPECIALTIES, INC.

2100 SO. 52nd AVE. CHICAGO 50, ILLINOIS

DANLYWELD

Danly Die Sets • Die Makers' Supplies • Welded Steel Fabrication

Rohn Strip Mill Patent May Be Had From Alien Property Custodian

Washington

• • • Complete blueprints for a strip rolling mill mechanism covered by U. S. Patent No. 1,903,724, issued to Wilhelm Rohn of Hanau-on-the-Main, Germany, and vested in the Alien Property Custodian, may now be obtained at nominal cost by Alien Property Custodian licensees. This is the result of negotiations between Alien Property Custodian James E. Markham and the U. S. Steel Corp. whereby the latter exchanged its former royalty-bearing exclusive license for the Custodian's standard royalty-free, non-exclusive license. Copies of these blueprints, adequate for a complete mill assembly under the patent, will be made available to other licensees for a nominal charge. The Custodian will grant to American citizens non-exclusive, royalty-free licenses for the life of the Rohn Patent for an administrative fee of $15, payable upon making application for the license. Inquiries regarding license applications should be addressed to the Office of Alien Property Custodian, Washington 25, D. C.

The Rohn Patent is a variation of the well-known four and six high strip rolling mills, the principle of which may be incorporated in 12 to 20-high rolling mills. The compact roll supporting mechanism is capable of withstanding very high pressures, and is particularly useful where the operating rolls have to be made very small. The rolling mill is said to be particularly advantageous for rolling special grades of alloy steel. One German-built Rohn mill has been operating intermittently for some five years in the Cleveland plant of American Steel & Wire Co. In general, the operational results have not reached expectations.

It consists of two oppositely placed sets of rolls, each set comprising an operating roll, the diameter of which may be as small as 1½ to 2 inches, supported by two primary rolls 2 to 2½ times the diameter of the operating rolls. Each pair of primary rolls in turn is supported by three supplementary rolls 2 to 2½ times the diameter of the primary rolls.

(Plate Shipments, October, 1941 to August, 1944)

(By Type of Mill) Source: WPB Steel Division

Month	Universal Mill		Sheared Mill		Strip Mill		Total
	Net Tons	Per Cent of Total	Net Tons	Per Cent of Total	Net Tons	Per Cent of Total	Net Tons
1941							
October	94,311	15.9	346,401	58.4	152,440	25.7	593,152
November	998,828	16.1	350,868	56.6	169,311	27.3	620,007
December	113,467	17.3	358,273	54.8	182,604	27.9	654,344
1942							
January	122,227	16.2	381,899	50.6	250,396	33.2	754,522
February	111,965	14.8	377,770	49.8	268,988	35.4	758,723
March	123,152	14.1	449,379	51.1	306,195	34.8	878,726
April	121,838	13.6	436,614	48.7	337,519	37.7	895,971
May	125,608	12.4	461,375	45.6	425,211	42.0	1,012,194
June	123,114	11.7	438,144	41.7	489,704	46.6	1,050,962
July	126,100	11.2	447,481	39.8	550,537	49.0	1,124,118
August	115,710	10.5	430,197	39.2	551,959	50.3	1,097,866
September	115,372	10.9	434,555	40.9	511,909	48.2	1,061,836
October	114,576	10.4	449,895	40.8	536,981	48.8	1,101,382
November	114,755	11.3	424,708	41.9	474,136	46.8	1,013,599
December	114,650	10.8	454,902	42.9	490,487	46.3	1,060,039
1943							
January	121,039	10.7	448,481	39.5	565,893	49.8	1,135,413
February	118,519	11.0	424,167	39.6	529,315	49.4	1,072,001
March	138,805	11.9	465,572	39.9	563,302	48.2	1,167,679
April	131,272	11.7	454,827	40.5	535,548	47.8	1,121,647
May	119,332	10.7	460,060	41.3	535,528	48.0	1,114,920
June	115,986	11.0	431,565	40.9	508,534	48.1	1,056,385
July	121,059	11.1	438,066	40.2	530,552	48.7	1,089,677
August	124,315	11.7	439,358	41.4	497,263	46.9	1,060,936
September	121,929	11.0	444,585	40.2	540,337	48.8	1,106,851
October	127,751	11.1	463,250	40.4	555,844	48.5	1,145,845
November	135,999	11.9	463,656	40.6	541,485	47.5	1,141,140
December	130,573	11.2	474,122	40.5	564,501	48.3	1,169,196
1944							
January	125,659	10.7	509,846	43.5	537,659	45.8	1,173,164
February	113,615	10.1	497,369	44.3	511,235	45.6	1,122,219
March	129 644	10.7	516.670	44.7	546,292	44.6	1,222.606
April	120 533	10.5	509 557	44.7	511,857	44.8	1,141 947
May	121.265	10.6	497,136	44.0	513 810	45.4	1,132 211
June	111 312	10.0	496 533	44.6	503,715	45.4	1,111 561
July	120 919	11.3	502,712	46.9	446,110	41.8	1,069.771
August	121,079	11.3	524,719	49.3	420,681	39.4	1,066,479

they may limp home . . . but they'll leap back

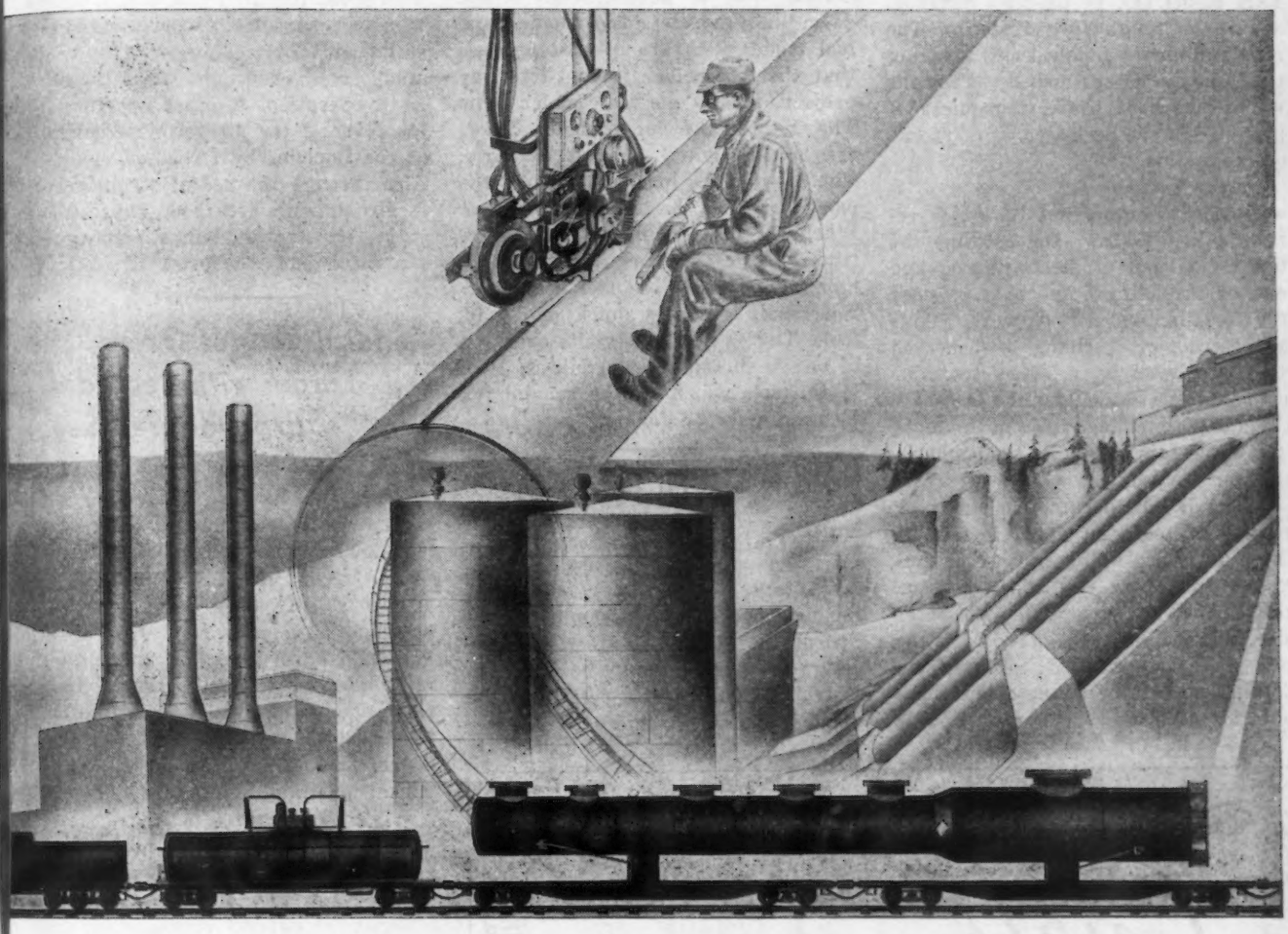
• The jobs of salvage performed in the open fields of France and at base repair shops in Britain are little short of miraculous—with all the skill and technique of American mass production.

When it comes to rebuilding motors, Holly produces special locking pins—much like a safety pin—in a variety of sizes and lengths. A single pin may be threaded through as many as half a hundred bolts, locking the nuts securely. These time saving, labor saving pins are but one of a thousand examples of Holly's versatile facilities now engaged in peace as well as war time pursuits.

Phone Holly 2211 or from Detroit dial Cherry 4419

AMERICAN SPRING OF HOLLY, INC.
HOLLY, MICHIGAN

THERE'S GATX KNOW-HOW



BACK OF EVERY JOB

In every quarter of the globe are General American products—pressure vessels, tanks, fractionating columns, stacks, penstocks, and many more varied in description and function, but having one thing in common—GATX Know-How.

GENERAL AMERICAN TRANSPORTATION CORPORATION

GATX GENERAL AMERICAN PLATE & WELDING DIVISION PLANT AT SHARON, PA.

Plate & Welding Division — Sharon, Pennsylvania

Specialists in plate fabrication—manufacturers of pressure vessels of steel, alloys and aluminum—all classes of welding—process equipment of all types—chemical engineering laboratories and service—completely equipped field erection department.

Precision Work on Old Lathes

(CONTINUED FROM PAGE 63)

This model can be used on hexagon, square or rough forged shafts. The rolls run on the finished cut, insuring the same diameter finished cut for the whole length of shaft, regardless of play in spindle, or looseness of saddle or cross slide.

In the development of the tool, it was soon observed that the quick retractability feature for moving the tool in and out at the beginning and end of threading cuts could be used for forming and cutoff work. This suggested a quick change tool method (Fig. 3) whereby a setup could be made on the lathe and the operator could rapidly change tools in the making of certain types of studs, bushing and washers.

Model B incorporates such a quick change of tools, as noted in Fig. 3, there is a projecting pin which has a slot turned in the upper portion, this slot having an angle on the outer side. The tool holder is bored to fit the pin and counterbored to precision depth. The bottom of the counterbore has the same angle as the outer side of the slot on the projecting arm. Accordingly, when the tool holder is slipped over the pin, up against tool holder arm, it automatically drops down into the slot. Tool holder and tool holder arm are both stepped so that the tool holder is backed up by projecting step on tool holder arm. The angle in the slot naturally draws the holder tightly against the arm. The heavier the load on the tool, the more tightly is the tool holder locked. When the cut is finished, tool is retracted from the work and the operator merely picks the tool holder off. The result is a very quick change of tools. The ½ in. slot permits operator to use ½ in. square tool bits or ½ x ¾ in. tools which can be ground for forming or broad facing.

Vacuum Test Pit for Impellers

(CONTINUED FROM PAGE 58)

safety of operation of cast or fabricated fans, the fan may be run at sufficient overspeed to permit calculation of the factor of safety. On new design the impeller may be tested to destruction in order to determine the weakest section or some unpredictable condition. A laminated shield protects the main shell against impact. A check on fan balance can be made on high speed impellers that might otherwise be impossible, except at final installation. There is an opportunity to study stress conditions while the unit is in operation. A glass aperture in the cover of the pit permits visibility of the impeller by stroboscopic light. Also through the use of strain gages in circuit with a cathode ray oscilloscope, stresses and vibration may be visualized and measured.

Federal Budget Grows Larger with Record Expenditures Seen

New York

• • • The Federal budget for the current fiscal year, which ends June 30, 1945, provides for the expenditure of the record large amount of $98,404,000,000. This compares with the previous high record of $93,744,000 in the last fiscal year. Expenditures in August were close to the monthly rate called for in the budget, totaling $8,119,000,000 as against $7,617,000,000 in August 1943, according to the Alexander Hamilton Institute.

While expenditures in August were larger than in the same month last year, receipts were smaller than a year ago despite the fact that the Government expects revenues for the full year to exceed last year's receipts. Receipts in August declined to $2,568,000,000 from $2,721,000,000 in the corresponding month of 1943.

Bryant Grinder Produces Film on Internal Grinding

• • • "Tooling for Better Grinding" is the title of a new 1600 ft., 16 mm. sound film produced by the Bryant Chucking Grinder Co., Springfield, Vt. It shows the importance of universal tooling for small lot production, standard tooling for production work and special tooling to enable several operations to be completed in one setup. It also shows both plunge and traverse methods of irregular center grinding.

Not a primary training film for apprentices, nevertheless the film is instructional in character rather than commercial in that it shows correct methods, setups and fixtures which may be adapted to any type of internal grinder. Showing time is 40 min. The film is available to engineering societies on a free loan basis from the company.

"Curls" ... we thought he was a hairdresser until we found he was from Brooklyn and meant "coils" in a spring. No matter how you say it, when you talk springs, you're talking our language and we'll get along great ... without an interpreter ... for we try to be

"Everybody's Spring Dept."

DUNBAR
BROTHERS CO.
DIV. OF ASSOCIATED SPRING CORP.
BRISTOL, CONN.

SPRINGS · WIRE FORMS · SMALL STAMPINGS

LOOK TO FENN FOR YOUR SPECIAL MACHINERY NEEDS

3 Generations of Fenns have specialized in building machinery. They have the designing and engineering skill backed by years of craftsmanship and experience.

REDESIGNING MACHINERY for Profitable Post War Production

If you are thinking of redesigning old machines or building new ones, it is time to plan NOW.

Fenn Aircraft BUILT PARTS FOR FAMOUS PLANES

Today Fenn is wholly engaged in war production. Thousands of precision parts and subassemblies flow from Fenn Plants into the construction of such famous planes as the Navy Corsair. Other Fenn parts and assemblies are made for ships, tanks, guns and vital war equipment.

FENN Plants - Strategically located for Efficient Service

Fenn plants, located at Hartford and New Britain, will once again build special machinery at the close of the war. The men with the skill and experience to solve machine design and development problems, will be ready to work with you. Planning, blueprinting and engineering can be done now. Your inquiries involve no obligation.

Experienced Designers and Machine Builders With A Long-Time Reputation for Precision Workmanship. We invite your inquiries.

THE FENN MANUFACTURING COMPANY

HARTFORD • CONNECTICUT

MACHINE TOOLS

. . . News and Market Activities

Priority Assistance Clarified by WPB

Washington

• • • Issued recently by WPB Interpretation 2 to P-43 makes clear the extent to which priorities assistance provided by preference rating Order P-43 may be used to get tools and tooling—dies, molds, jigs, fixtures, patterns and other equipment—needed to make experimental models of articles.

This equipment for making experimental models, the manufacture of which is permitted without taking advantage of PR-23, may be obtained through priorities assistance under P-43, regardless of whether the tools and tooling are treated as operating supplies or capital additions.

For experimental models that cannot be made except through permission granted by PR-23, priority assistance under P-43 may be used for getting tools and tooling only if they are charged as operating supplies. If they are additions, priorities must be obtained by the standard procedures for getting tools and tooling.

The question of whether a particular tool or tooling item would be a capital addition is determined by the manufacturer's established accounting practice, according to the interpretation.

"It would, of course, be improper for a person to change his established accounting practice for the purpose of enabling himself to use the P-43 priorities assistance," the interpretation stresses.

The cost of any tools and tooling for experimental models that could not be made except for PR-23 must be included in determining the cost of the models, WPB pointed out. PR-23 allows a person to make such models costing in the aggregate not more than $5000 a month in a single plant. If the cost is more than $5000 a month for all such models of all products, application for authorization must be made to WPB field offices (WPB Form 3879). All direct costs, such as materials, components, subassemblies, labor, designing and drafting, are included.

Under P-43, only AA-3 ratings are given for tools and tooling for making experimental models of products designed primarily for civilian markets. AA-2 ratings and AA-1 ratings (in the case of serially numbered laboratories) are granted to get tools and tooling for experimental models of products for military use.

A person who is permitted to use P-43 priorities to get tools and tooling for experimental models may also use the priorities to get materials needed to make the tools and tooling himself, the interpretation states.

Bullard Shows Red

The Bullard Co., Bridgeport, reported a net loss of $286,692 for the six months ended June 30, compared with a profit of $1,161,908 for the same 1943 period. According to E. P. Bullard, president, the loss was due to conversion costs at a time when machine tool shipments were low. To convert to the manufacture of aircraft torpedoes, marine turbines, rubber mixing machinery and truck differential carriers cost Bullard $960,000. Net sales for the first six months of 1944 were only $10,618,915 as compared with $25,324,216 for the 1943 period. The second half of the year is expected to show better results, Mr. Bullard stated.

Sugar Machinery Needs To Expand after V-E Day

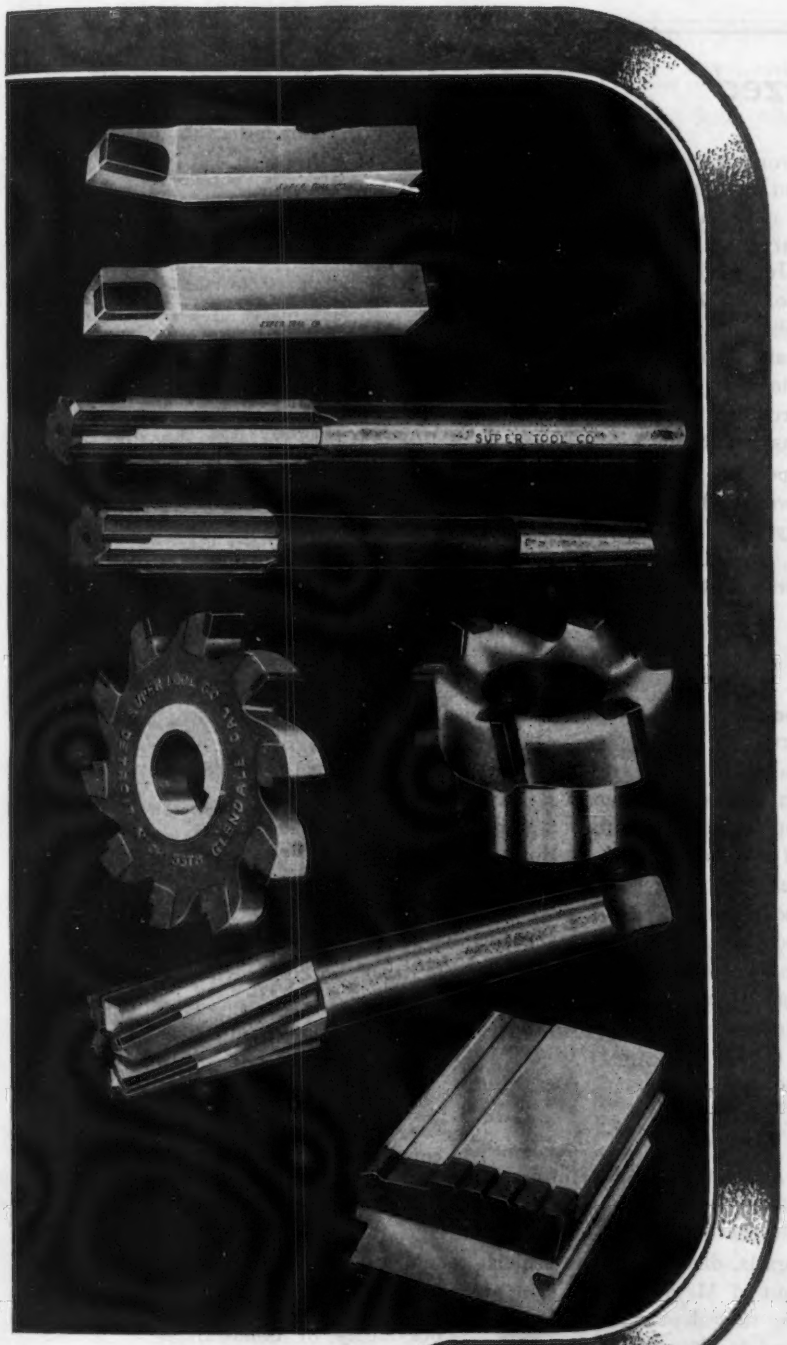
Washington

• • • A large increase in export and domestic orders for sugar machinery and equipment is expected after the defeat of Germany, members of the newly-formed Sugar Machinery and Equipment Industry Advisory Committee reported at a recent meeting with WPB officials.

To plan for future production, industry members recommended immediate elimination of distribution controls from Order L-292, which limits its distribution through preference ratings, and the complete revocation of the order following the collapse of Germany. If L-292 is amended and the industry is allowed to accept unrated orders, committee members further recommend that a quota be established, based on orders approved during the last six months. War contracts, manpower problems, lack of component parts and expanding approval of applications are delaying the filling of rated orders, industry members reported. The backlog now stands at $1,480,000.

V-DAY WORKERS: *Pledges by employees of Pullman-Standard Car Mfg. Co. Chicago plants to remain on the job on V-day in Europe indicate that only 11 of nearly 12,000 employees will be absent. In this department, 98 per cent took the pledge.*

SUPER TOOLS...



FOR SPEED and ACCURACY ON EVERY CUTTING JOB

CARBIDE TIPPED TOOL BITS

For turning, boring or facing these single point tools are extremely efficient when machining all materials including hard steels. They cut fast, clean and true. Low heat absorption means less pitting when cutting soft steels.

CARBIDE TIPPED STANDARD REAMERS

These extremely fast, true and clean cutting solid type standard reamers are available with either a straight or tapered shank. They have proved their ability to hold their size over long runs on all types of reaming jobs.

CARBIDE TIPPED MILLING CUTTERS

For faster production, greater accuracy and money-saving economy on all types of milling jobs—cast iron and non-ferrous materials as well as steel. The low cost of these milling cutters permits their use on short as well as long runs.

CARBIDE TIPPED SPECIAL TOOLS

The wide experience of Super Tool engineers is backed by unequalled laboratory resources for creating special tools to meet your specific production needs. Super special tools are speeding production in hundreds of war plants. Send us your prints and specifications for recommendations and estimates.

SUPER TOOL COMPANY

Carbide Tipped Tools

21650 Hoover Rd., Detroit 13, Mich. 4105 San Fernando Rd., Glendale 4, Cal.

NON-FERROUS METALS

. . . News and Market Activities

Premium Payments Scrutinized

• • • **Evidence grows that officials** anticipate much easier supplies of copper and zinc, at least after the approaching collapse of Germany. Recently a committee comprised of representatives of WPB, OPA and Metals Reserve Co. started to study OPA proposed modification of the premium price plan with respect to copper, zinc and lead. Supplies of the latter are being reduced month by month, despite relatively moderate war demands, to such an extent that leaders of the industry consider it scarcely likely that premiums could be appreciably reduced without impairing our stock position.

However copper and zinc are expected to become freely available to meet all war and civilian demands when cancellation of war contracts begins in earnest with the defeat of Germany. Government agencies are said to have completed plans for the release of these metals for full civilian consumption at that time. It is not long since copper was obtainable only on WPB allocation. Like copper, zinc has now been made available to consumers without reporting requirements monthly. However consumers of 40,000 lb. or more zinc in any one month report to the Bureau of Mines. Prior to this action there has been a gradual relaxation of the restrictions placed upon use of the two metals for essential civilian applications.

Should premium payments be dropped or appreciably diminished, it would naturally cause certain high cost mining areas to go out of production. While the bulk of mine production of copper, zinc and lead during the war has been for marketing at established ceilings of 12c., 7.25c. and 6.5c. per lb., respectively, additional production has been encouraged by subsidies for that in excess of quotas based originally on 1941 production. Quotas have been revised from time to time as warranted by conditions. Premium payments have amounted to 5c. and more per lb. for copper, 8.25c. for zinc, and 5.5c. for lead.

In the case of zinc, the Tri-state District consisting of Oklahoma, Missouri and Kansas produced 27 per cent of national production in the third quarter of 1943. Yet according to Mr. James Douglas of the Zinc Division of WPB, only 31.8 per cent of such production was at the fixed price for the area. Declining supplies of low grade zinc ore in the Tri-state district require high prices to make operations profitable.

In copper, 90 per cent of 1942 production was without premium, but in 1943 only 75 per cent was without premium, according to Dr. Ingalls of the American Bureau of Metal Statistics.

•

Lead

• • • **Stocks of lead and antimony** are reported to be decreasing. These two metals are therefore in a very good competitive position regardless of the approaching termination of the war and prospective relaxation of government controls. Were ceilings to be discontinued at this time, it is considered probable that prices would rise. On the other hand remelters have dropped their buying prices for used battery plates by increasing the smelting charge to a range of $25 to $26 per ton.

•

Postwar Copper

• • • **An annual consumption** of about 1,265,000 tons of copper in the United States is predicted by Dr. W. R. Ingalls, director of the American Bureau of Metal Statistics in an article in the September issue of *Mining and Metallurgy*. This amount is expected to be composed of about 850,000 tons of new metal and about 415,000 tons of reclaimed metal. This total represents about 18 lb. per capita of an anticipated population of 140 million in 1945.

Assuming that the copper industry will be protected after the war by a continuance of the tariff of 4c. per lb. which has been held in suspension with other similar tariffs to permit Metals Reserve Co. to accumulate stockpiles of strategic metals, Dr. Ingalls summarizes potential distribution of copper in the following industries:

	Tons
Electrical manufactures	250,000
Telephone and telegraph	80,000
Light and power (public utilities)	125,000
Building	225,000
Motor vehicles	140,000
Refrigerators	23,000
Railway equipment and operation	100,000
Other bearings and bushings	60,000
Ammunition (sporting, hunting, etc.)	12,000
Wire not elsewhere included	50,000
Sundry uses, airplanes, pumps, etc.	200,000
Total	1,265,000

In discussing the nearly a million tons of copper owned by the government at the beginning of 1944, Dr. Ingalls submitted the following figures:

	Tons
Blister at smelters, refineries and in transit	52,847
In process at refineries	165,703
Refined shapes and cathodes at refineries	98,019
Refined shapes at fabricating mills	121,317
In process at mills	232,382
In scrap in dealers' warehouses	48,700
Belonging to Metals Reserve Co., estimated	200,000
Total	918,968

Stocks of blister at smelters, in transit, and in process at refineries and fabricating mills are normal operating stocks, and this is true also of dealers' scrap supplies.

The Metals Reserve Co. stocks of copper have until recently caused uneasiness in the industry, but it is generally agreed now that approval of the Congressional compromise measure has done much to relieve the industry of apprehension over the possibility of demoralization of our mine production facilities. As this measure has been approved, it places responsibility upon the Army and Navy Munitions Board for the selection of the strategic minerals and metals and determination of the amounts required for stockpiling. Surplus materials may be disposed of a year after this determination which is due in three months, unless Congress in the meantime decides otherwise.

Primary Metals

(Cents per lb. unless otherwise noted)

Aluminum, 99+%, del'd. (Min. 10,000 lb.)	15.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be	$17.00
Cadmium, del'd.	90.00
Cobalt, 97-99% (per lb.)	$1.50 to 1.75
Copper, electro. Conn. valley	12.00
Copper, electro. New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.5%, dollars per troy oz.	$7.50
Iridium, dollars per troy oz.	$165.00
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9+%, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb. flask, f.o.b. New York	$105 to $106.00
Nickel, electro	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per oz.	$35.00
Silver, open market, New York, cents per oz.	44.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.67

Remelted Metals

(Cents per lb. unless otherwise noted)

Aluminum, No. 12 Fdy. (No. 2)	10.00
Aluminum, deoxidizing	7.00 to 10.50
Brass Ingot	
85-5-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
80-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

Copper, Copper Base Alloys

(Mill base, cents per lb.)

	Extruded Shapes	Rods	Sheets
Copper	20.87	....	20.37
Copper, H.R.	....	17.37	....
Copper drawn	....	18.37	....
Low brass, 80%	....	20.40	20.15
High brass	....	....	19.48
Red brass, 85%	....	20.61	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut	....	15.01	....
Commercial bronze, 90%	....	21.32	21.07
Commercial bronze, 95%	....	21.53	21.28
Manganese bronze	24.00	....	28.00
Phos. bronze, A, B, 5%	....	36.50	36.25
Muntz metal	20.12	18.87	22.75
Everdur, Herculoy, Olympic or equal	....	25.50	26.00
Nickel silver, 5%	....	28.75	26.50
Architect bronze	19.12	....	....

Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (½H); 52S, 61c. (O); 24S, 67½c. (T).

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals; ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 24c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

NON-FERROUS SCRAP METAL QUOTATIONS

†(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (Phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.50
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25
Automobile radiators	7.00

OPA Group 3†

Yellow brass soft sheet clippings	8.625
Yellow rod brass turnings	8.375
Zincy bronze borings	8.00
Zincy bronze solids	8.00
Fired rifle shells	8.25
Brass pipe	7.50
Old rolled brass	7.00
Admiralty condenser tubes	7.50
Muntz metal condenser tubes	7.00
Plated brass sheet, pipe reflectors	6.50
Manganese bronze solids	7.25[1]
Manganese bronze solids	6.25[2]
Manganese bronze borings	6.50[1]
Manganese bronze borings	5.50[2]

OPA Group 4†

Refinery brass	4.75*

*Price varies with analysis. [1] Lead content 0.00 to 0.40 per cent. [2] Lead content 0.41 to 1.00 per cent.

Other Copper Alloys†

Briquetted Cartridge Brass Turnings	8.625
Cartridge Brass Turnings, Loose	7.875
Loose Yellow Brass Trimmings	7.875

Aluminum

Plant scrap, segregated

2s solids	3.00
Dural alloys 14, 17, 18, 24, 25S solids	4.00
turnings, dry basis	2.50
Low copper alloys 51, 52, 61, 63S solids	6.00
turnings, dry basis	4.00

Plant scrap, mixed

Turnings, dry basis	2.00

Obsolete scrap

Pure cable	7.00
Old sheet and utensils	5.00
Old castings and forgings	4.50
Pistons, free of struts	4.00
Pistons, with struts	2.00
Old alloy sheet	3.50

Magnesium

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	3.00

Mixed, contaminated plant scrap

Grade 1 solids	6.00
Grade 1 borings and turnings	3.00
Grade 2 solids	3.00
Grade 2 borings and turnings	2.00

Zinc

New zinc clippings, trimmings	6.50
Engravers' lithographers plates	6.50
Old zinc scrap	5.25
Unsweated zinc dross	5.50
Die cast slab	5.00
New die cast scrap	4.95
Radiator grilles, old and new	4.00
Old die cast scrap	3.50

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead inc. cable, for f.o.b. point of shipment price.

Nickel

Ni content 98+%, Cu under ½%, 26c. per lb.; 90 to 98% Ni, 26c. per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point)

Copper: Cast, elliptical, 15 in. and longer	25⅛
Electrolytic, full size	22⅞
cut to size	30⅛
Rolled, oval, straight, 15 in. and longer	23⅛
Curved	24¼
Brass Cast, 82-20, elliptical, 15 in. and longer	23⅝
Zinc: Cast, 99.99, 16 in. and over	16¼
Nickel: 99% plus, cast	47
Rolled, depolarized	48
Silver: Rolled, 999 fine per Troy (1-9) oz., per oz.	58

Chemicals

(Cents per lb., delivery from New York)

Copper cyanide, tech., 100-lb. bbls. 1-5	5.65
Copper sulphate, 99.5 crystals, bbls.	13.00-13.50
Nickel salts, single, 425-lb. bbls.	34.00
Silver cyanide, 100 oz., lots	40.82-41.125
Sodium cyanide, 96% dom., 100-lb. dms.	0.15
Zinc cyanide, 100-lb. dms.	33.00
Zinc, sulphate, 89% crystals, bbls.	6.80

SCRAP

. . . News and Market Activities

Prices Sag Again in Dull Market

• • • **Practically every district** in the country echoes with boring regularity the fact that there is no market for iron and steel scrap. This condition has prevailed for so long a time that even prime quality scrap is being offered an average of several dollars per ton below ceilings without takers. Lesser grades have dropped proportionately more with the result that there is scarcely any margin in some grades to pay for the material before preparation.

The scrap trade cannot continue to absorb the losses recently sustained without forcing basic elements of the industry out of business. Collectors are already a thing of the past, for with high wages elsewhere and low remuneration from their business,

Other Scrap News Page 99.

their interest has naturally been diverted. Preparation yards are suffering between high trucking and bundling labor costs and lack of manpower, and a market that is virtually non-existent so that prices are tobogganing.

Prices of all grades except cast are down again this week in Pittsburgh, Cleveland, New York, Buffalo and Boston. In Detroit even cast grades have been reduced. Last week there was a tendency to softening of prices of cast grades in some districts. Except for Detroit, cast prices have stiffened due not to large consumption but to limited supplies.

PITTSBURGH—Speculation continues as to how long mills can continue at current operating levels and still take in as little scrap as they have for the past six weeks. The consensus is that they can carry through October. There is no new scrap movement in this area, but some shipments are being made on orders that were held over from August and spread through September. Scrap yards do not have much scrap on hand and their new orders are extremely thin. In the face of current conditions dealers hesitate to sell (at current prices) material that is not on hand because mills are buying for two to three-week delivery and dealers can't buy unprepared scrap, most of which is sold on a 30-day basis, because they have no selling prices to cover the time of such commitments. The small yard operators and dealers are facing what might be the most crucial period in their history. Automotive companies, Navy and shipbuilding yards, arsenals and railroads are flooding the market with offerings, while consumers are buying very lightly.

•

CHICAGO—In the continued absence of new mill purchases the Chicago market situation can only be judged on the basis of dealer broker transactions plus the basis of last previous orders. Essentially it is a brokers' market insofar as their purchase prices are concerned. Many specialty items in the electric furnace and railroad classifications are being sold as heavy melting steel in the absence of specialty demand and the prices quoted must be considered nominal and subject to adjustment if and when such specialty demand develops.

•

DETROIT—Bidding on automotive lists out this week will furnish a clue to the direction of the market here. Because mill buying is practically non-existent except for shipments being made on August buys, anticipations continue pessimistic. The only new movements of consequence are turnings shipments into Pittsburgh district and these are being delivered at prices indicating Detroit purchase at no more than $5.50 maximum. Other quotations also sagged this week, but not to the extent of the blast furnace grades.

•

NEW YORK—Open hearth grades are being purchased in this area at 25c. per ton less this week, a drop from ceiling of $3.33 for No. 1 heavy melting, $4.33 for No. 2, $5.33 for compressed black bundles, $7.33 for galvanized bundles. Turnings are being bought for about $5.00 below ceiling. It is understandable that government officials concerned with scrap iron and steel prices and supplies should be meeting this week in New York City. Demand for cast iron scrap seems to be falling off but prices of all grades remain at ceilings since the supply is limited. The only mill buyer in this market is issuing purchase contracts providing for cancellation if delivery is not made within two weeks. Each renewal brings a lower offer.

•

LOS ANGELES — Commitments by Kaiser Co., Inc., to take over shipyard scrap from Calship and Consolidated Steel at Wilmington, as produced, should start to restore normal scrap local movement in the Pacific Southwest. Preparation will be performed in transit by dealers in Los Angeles. Similar recent arrangements in Portland between Geneva Steel Co. and Oregon Shipbuilding Corp. should help to absorb surpluses in that area. Scrap shipments to the Midwest from the West Coast are dwindling and are expected soon to cease. Less maritime scrap is being generated because of construction of different types of vessels. Production of incoming commercial scrap has been reduced from 40 to 50 per cent.

•

PHILADELPHIA—With one exception, mills in eastern Pennsylvania are showing little interest in open hearth grades. The downward trend of open hearth prices has affected even those items in good demand like cast scrap which in some cases has been sold at $15, f.o.b. shipping point for heavy breakable and machine shop turnings which have been sold at $10 to $11. In some cases, the shipper has not only absorbed the freight but the three per cent freight tax as well.

•

ST. LOUIS—The scrap market continues weak, with dealers here and in the country striving to liquidate their stocks for fear of a collapse of the market with the surrender of Germany. Three of the larger mills in the district are out of the market and one concern has cancelled outstanding orders. Heavy turnings are down $1, steel angle bars are off $3, stove plate $2 less, and railroad malleable is quoted at $21. Miscellaneous standard section rails and railroad springs are $17.00 to $17.50. Cast grades are f.o.b. shipping point, with a maximum freight of $2.50, although several mills will make no allowance for freight.

•

BUFFALO—The Buffalo scrap market is flat on its back with no sales being made and the biggest consumer refusing to make any offers. Open hearth scrap can be bought from $1 to $2 below ceiling prices if anyone wants it and steel turnings can be had around $10, with no takers. While the mills are reported pretty well loaded up the trade expects buying to be resumed shortly to assure winter stockpiles. Actual sales are expected to be made at prices much lower than prevailed only a month ago. Cast and specialties are firm.

•

BOSTON—Quotations have fallen to a new 1944 low level. Those for heavy melting steel and bundled skeleton have a dollar spread instead of the usual 50c. Prices, however, are purely nominal as business is at a standstill. At current rates and the high cost of labor some yards stand to lose money on shipments. Only one mill is buying. Foundry scrap holds at ceilings.

•

CLEVELAND — Scrap movement here is still at an extremely low rate, as it is also in the valley district. About the only movement has been on distressed material which has moved at a depressed price. Such sales however have not been great and are not generally indicative of true pricing conditions. Even without sales, dealers and brokers maintain a semblance of a price structure.

•

CINCINNATI—Consumers continue to back away from the market and the price structure, while unchanged, may be considered nominal. Dealers indicate that mills with expiring contracts show no great rush to cover but tend to mark time and await developments. Dealers recently have been trading to cover old orders but little or no material is being piled in the yards.

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages (for ceiling prices see O. P. A. schedule No. 4).

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melt	$17.00 to $17.50
RR. hvy. melt	18.00 to 18.50
No. 2 hvy. melt	16.00 to 16.50
RR scrap rails	22.00 plus frt.
Rails 3 ft. and under	24.00 plus frt.
Compressed sheets	17.00 to 17.50
Hand bdld. sheets	16.00 to 16.50
Hvy. axle turn	16.50 to 17.00
Mach. shop turn	10.00 to 10.50
Hvy. steel forge turn.	16.50 to 17.00
Short shov. turn	13.50 to 14.00
Mixed bor. and turn.	10.00 to 10.50
Hvy. break. cast	16.50 plus frt.
Cast iron borings	13.50 to 14.00
No. 1 cupola	20.00 plus frt.
RR knuck. and coup.	24.00 to 25.00
RR coil springs	24.00 to 24.50
Rail leaf springs	24.00 to 24.50
Rolled steel wheels	24.00 to 24.50
Low phos. billet crops	25.00
Low phos.	19.50 to 20.00
RR malleable	22.00 plus frt.

CHICAGO

Per gross ton delivered to consumer

No. 1 hvy. melting	$18.25 to $18.75
No. 2 hvy. melting	17.25 to 17.75
No. 1 bundles	18.25 to 18.75
No. 2 dealers' bndls.	16.25 to 16.75
Bndld. mach. shop turnings	16.25 to 16.75
Galv. bundles (No. 3)	14.25 to 14.75
Mach. shop turnings	9.50 to 10.00
Short shoveling trngs.	11.00 to 11.50
Cast iron borings	10.00 to 10.50
Mix bor. & short turn.	10.00 to 10.50
Low phos. hvy. forge	20.75 to 21.25
Low phos. plates	18.25 to 18.75
No. 1 RR hvy. mltng.	18.75
Reroll rails	22.25
Cut rails, 3 ft. and under	21.75 to 22.25
Locomotive tires, cut	20.75 to 21.25
Cut bolsters & side frames	18.75 to 19.25
Angles & splice bars	19.75 to 20.25
No. 3 steel wheels	21.00 to 21.50
Couplers & knuckles	21.00 to 21.50
Cut rails, 2 ft. and under	23.00 to 23.50
Miscellaneous rails	19.75 to 20.25
St'dard stl. car axles	23.50 to 24.00
No. 1 mach. cast	21.34 to 23.00
No. 1 agricul. cast	21.34 to 23.00
Cast iron car wheels	21.34 to 23.00
Hvy. breakable cast	17.34 to 17.84
RR grate bars	16.59 to 18.25
Brake shoes	16.59 to 17.09
Stove plate	20.34 to 20.84
Clean auto cast	21.34 to 23.00
Agricul. malleable	23.34 to 25.00
RR malleable	23.34 to 25.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$16.00 to $16.50
No. 2 hvy. melting	16.00 to 16.50
Compressed sheet stl.	16.00 to 16.50
Drop forge flashings	16.00 to 16.50
Mach. shop turnings	8.00 to 9.00
Short shovel. trngs.	13.00 to 14.00
No. 1 busheling	16.00 to 16.50
Steel axle turnings	15.50 to 16.00
Low phos. billet and bloom crops	20.00 to 21.00
Cast iron borings	13.00 to 14.00
Mixed bor. & turns.	11.00 to 11.50
No. 2 busheling	14.00 to 14.50
No. 1 machine cast	20.00 to 26.00
Railroad cast	20.00 to 26.00
Railroad grate bars	15.25
Stove plate	19.00 to 23.00
Rails 3 ft. & under	23.00
Rails 18 in. & under	24.25
Rails for rerolling	23.50
Railroad malleable	22.00
Elec. furnace punchings	19.50 to 20.50

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	$11.50 to $12.00
No. 1 hvy. comp. sh'ts	11.50 to 12.00
No. 2 hvy. melting	11.50 to 12.00
No. 1 bundles	11.50 to 12.00
New busheling	11.50 to 12.00
Mach. shop turnings	5.00 to 5.50
Short shov. turnings	7.00 to 7.50
Cast iron borings	6.00 to 6.50
Mixed bor. & turns.	5.00 to 5.50
No. 1 cupola cast	19.00 to 20.00
Charging box cast	15.75 to 16.25
Hvy. breakable cast	13.25 to 13.75
Stove plate	17.00 to 17.50
Flashings	11.50 to 12.00
Low phos. plate	16.00 to 16.50
Automotive cast	19.00 to 20.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$15.00 to $15.50
No. 2 hvy. melting	15.00 to 15.50
No. 1 bundles	15.00 to 15.50
Mach. shop turnings	10.00 to 11.00
Shoveling turnings	13.00 to 13.50
Cast iron borings	13.00 to 13.50
Mixed bor. & turns.	10.00 to 11.00
No. 1 cupola cast	*20.00
Hvy. breakable cast	15.00 to *16.50
Cast. charging box	17.50 to *19.00
Hvy. axle, forge turn.	16.25 to 16.75
Low phos. plate	19.00 to 19.50
Low phos. punchings	19.75 to 20.25
Billet crops	19.25 to 19.75
RR. steel wheels	19.50 to 20.00
RR. coil springs	19.50 to 20.00
RR. malleable	23.64

*F.o.b. shipping point.

ST. LOUIS

Per gross ton delivered to consumer:

Hvy. melting	$16.50
No. 1 locomotive tires	16.00
Misc. stand. sec. rails	17.00
Railroad springs	$17.00 to 17.50
Bundled sheets	15.00
Heavy turnings	11.25
Rerolling rails	21.00
Steel car axles	23.50
Steel rails under 3 ft.	21.50
Steel angle bars	18.00
Cast iron car wheels	20.00
No. 1 machinery cast	20.00
Railroad malleable	21.00
Breakable cast	16.50
Stove plate	17.00
Grate bars	15.25
Brake shoes	15.25

Note: Cast grades f.o.b. Shipping Point.

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$15.00 to $15.50
No. 2 hvy. melting	15.00 to 15.50
No. 2 bundles	14.00 to 14.50
No. 1 busheling	12.00 to 12.50
Scrap rails	15.00 to 15.50
Rails for rerolling	18.00 to 18.50
Rails 3 ft. & under	18.00 to 18.50
Angle & splice bars	17.00 to 17.50
Long turnings	5.00 to 5.50
Cast iron borings	7.00 to 7.50
Steel axles	15.00 to 15.50
Stove plate	17.00 to 17.50
Bar Crops and plate	17.00 to 17.50
Structural and plate	17.00 to 17.50
No. 1 cast	20.00 to 21.00
Cast iron carwheels	13.00 to 13.50

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.00 to $18.00
No. 2 hvy. melting	17.00 to 18.00
Low phos. plate	19.00 to 20.00
No. 1 busheling	17.00 to 18.00
Hydraulic bundles	17.00 to 18.00
Mach. shop turnings	9.50 to 10.50
Short shovel. trngs.	14.00 to 15.00
Cast iron borings	13.00 to 14.00

NEW YORK

Dealers' buying prices, per gross ton, on cars:

No. 1 hvy. melting	$12.00 to $12.50
No. 2 hvy. melting	11.00 to 11.50
No. 1 busheling	11.25 to 11.75
Hyd. comp. black bundles	10.00 to 10.50
Hyd. comp. galv. bundles	8.00 to 8.50
Hvy. breakable cast	16.50
Charging box cast	17.50
No. 1 cupola cast	20.00
Stove plate	19.00
Clean chem. cast bor.	14.33
Mach. shop turnings	6.50 to 7.00
Mixed bor. & turns.	6.50 to 7.00
Clean auto cast	20.00
Unstrip. motor blks.	17.50

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.50 to $19.50
No. 2 hvy. melting	18.50 to 19.50
No. 1 bundles	18.50 to 19.50
No. 2 bundles	18.50 to 19.50
Mach. shop turnings	13.00 to 14.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	13.50 to 14.50
Mixed bor. & turns.	12.50 to 13.50
No. 1 cupola cast	21.00
Hvy. breakable cast	16.50
Low phos. plate	21.00 to 22.00
Scrap rails	21.00
Stove plate	17.00 to 18.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.00 to $18.25
No. 1 bundles	16.50 to 17.25
No. 2 bundles	16.00 to 17.00
No. 2 hvy. melting	16.50 to 17.25
Mach. shop turnings	9.00 to 10.00
Shoveling turnings	14.25
Cast iron borings	15.25
Mixed bor. & turns.	12.25
No. 1 cupola cast	20.80 to 22.50
Stove plate	19.80 to 21.50
Low phos. plate	21.75
Scrap rails	20.75
Rails 3 ft. & under	22.75
RR steel wheels	23.75
Cast iron car wheels	20.00
RR coil & leaf sprgs.	23.75
RR knuckles & coup.	23.75
RR malleable	23.00
No. 1 busheling	19.25

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$10.00 to $11.00
No. 2 hvy. melting	9.00 to 10.00
Bundled skeleton	9.00 to 10.00
Turnings, shovelings	7.00 to 7.50
Turnings, regular	5.50 to 5.75
Mixed bor. & turns.	5.00 to 5.50
Mixed alloy turnings	4.00 to 4.50
Clean cast chem. bor.	13.06 to 14.15
Delivered to fdry. per gr. ton	
Breakable cast	21.57 to 21.87
Stove plate	20.00 to 23.51
Machinery cast, truck	21.00 to 23.51

CALIFORNIA BASING POINTS

Per gross ton delivered to consumer:

San Francisco and Los Angeles

No. 1 hvy. melting	$16.00 to $16.75
RR hvy. melting	16.00 to 16.75
No. 2 hvy. melting	15.00 to 15.75
Mach. shop turnings	4.50 to 7.00
No. 1 cupola cast	21.00 to 25.00
No. 2 bales	14.00 to 14.75
No. 3 bales	10.00 to 10.75
Electric furnace 1 ft. under	17.00 to 19.50

Seattle

No. 1 hvy. melting	$14.50
RR hvy. melting	14.50
No. 3 bundles	12.50
No. 1 cupola cast	$21.00 to 23.00
Electric furnace, 1 ft., under	16.00 to 17.00

Comparison of Prices . . .

Advances Over Past Week in **Heavy Type**; Declines in *Italics*. (Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	Sept. 26, 1944	Sept. 19, 1944	Aug. 22, 1944	Sept. 28, 1943
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate, standard cokes	$5.00	$5.00	$5.00	$5.00
Tin plate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs, rerolling	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	Sept. 26, 1944	Sept. 19, 1944	Aug. 22, 1944	Sept. 28, 1943
No. 2 fdy., Philadelphia	$25.84	$25.84	$25.84	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	25.11	25.11	25.11	24.68
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.34	25.34	25.34	25.39
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	37.34	37.34	37.34	31.34
Ferromanganese‡	135.00	135.00	135.00	135.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)				
Heavy melt'g steel, P'gh.	*$17.25*	$17.75	$20.00	$20.00
Heavy melt'g steel, Phila.	*15.25*	16.375	18.75	18.75
Heavy melt'g steel, Ch'go	*18.50*	18.75	18.75	18.75
No. 1 hy.-comp. sheet, Det.	*11.75*	12.75	17.85	17.85
Low phos. plate, Youngs'n	19.50	17.75	22.50	22.50
*No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
*No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Ch'go	22.17	22.17	20.00	20.00

*F.o.b. shipping point.

Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$7.00	$7.00	$7.00	$6.50
Foundry coke, prompt	8.25	8.25	8.25	7.50

Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 146-155.

Composite Prices . . .

Starting with the issue of April 22, 1943, the weighted finished steel price index was revised for the years 1941, 1942 and 1943. See explanation of the change on page 90 of the April 22, 1943, issue.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
September 26, 1944	2.25513c. a Lb.	23.61 a Gross Ton	*$17.00* a Gross Ton
One week ago	2.25513c. a Lb.	23.61 a Gross Ton	$17.625 a Gross Ton
One month ago	2.25513c. a Lb.	23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.26190c. a Lb.	23.61 a Gross Ton	$19.17 a Gross Ton

	HIGH	LOW	HIGH	LOW	LOW	HIGH
1943	2.25513c.,	2.25513c.,	$23.61	$23.61	$19.17	$19.17
1942	2.26190c.,	2.26190c.,	23.61	23.61	19.17	19.17
1941	2.43078c.,	2.43078c.,	$23.61, Mar. 20	$23.45, Jan. 2	$19.17, Apr. 10	$22.00, Jan. 7
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	16.04, Apr. 9	21.83, Dec. 30
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	14.08, May 16	22.50, Oct. 3
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	11.00, June 7	15.00, Nov. 22
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	12.67, June 8	21.92, Mar. 30
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	12.67, June 9	17.75, Dec. 21
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	10.33, Apr. 29	13.42, Dec. 10
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	9.50, Sept. 25	13.00, Mar. 13
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	6.75, Jan. 3	12.25, Aug. 8
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	6.43, July 5	8.50, Jan. 12
1931	1.99626c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	8.50, Dec. 29	11.33, Jan. 6
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	11.25, Dec. 9	15.00, Feb. 18
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	14.08, Dec. 3	17.58, Jan. 29

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

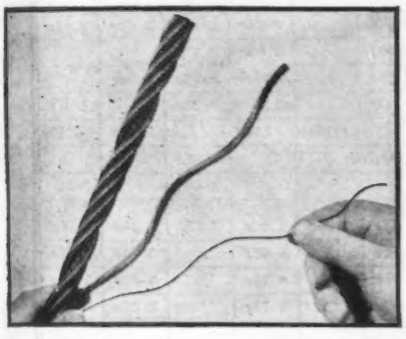
"What can Macwhyte PREformed Wire Rope do for Me?"

Here are specific ways you benefit from the use of Macwhyte PREformed wire rope.

First, you get longer wire rope service for 3 reasons:

1. PREformed has less internal fatigue.
2. PREformed has less internal friction.
3. PREformed has better balance.

Each wire and each strand are PREformed before being laid into the finished rope. The detrimental effects of internal friction and internal fatigue, two of wire rope's greatest destroyers, are reduced to a minimum in Macwhyte PREformed. There is perfect balance. Each strand and wire carries its share of the load.



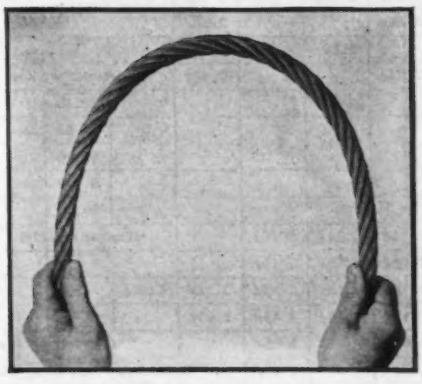
Second, you get lower cost per load carried.

In Macwhyte PREformed, every strand in the wire rope is under uniform tension. There is no "early wearing out" of some strands while the others "loaf." This perfect balance makes possible lower cost per load carried on the job.

Third, you get fewer shut-downs, less trouble.

Fewer shut-downs are the rule, because PREformed lasts longer. In these times, lost man hours due to repairs or replacements can be disastrous. PREformed helps prevent this.

Less trouble is encountered because PREformed is flexible, easy to handle. The perfect balance of strands means that PREformed is kink-resistant, very easy to take off the reel and put on your equipment.



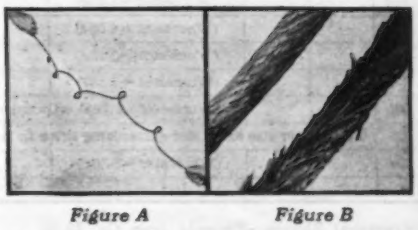


Figure A *Figure B*

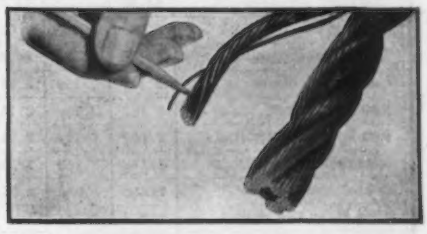
Fourth, you have less chance of rope loss or workman injuries.

Macwhyte PREformed is not likely to curl up *(Figure A)* during unreeling and installing. Therefore, the risk of kinking and permanently damaging the rope is greatly diminished.

Nor does PREformed wire rope wicker and become dangerous to handle *(Figure B)*. A wire broken from wear in a PREformed rope lies in place, does not wicker out to injure workmen's hands.

In addition to these 4 specific benefits, add this 5th: Macwhyte Internal Lubrication that goes around every wire in every strand of Macwhyte PREformed wire rope.

Inside bearing surfaces of wires are thus protected against friction and corrosion. All spaces between wires are filled with lubricant to keep out moisture and resist ordinary acids. This tenacious, heavy lubricant Macwhyte uses, clings to wires unaffected by the hottest, coldest, driest, or most humid temperatures.



Macwhyte engineering experience may help you. Tell us your problem. We'll assist you in getting the *correct* rope for your equipment.

MACWHYTE PREformed WIRE ROPE Plus Internal Lubrication Selected Steels Tested-Proved

The correct rope for your equipment

NO. 754

MACWHYTE COMPANY

Wire Rope Manufacturers

ARMY E NAVY

2911 FOURTEENTH AVENUE KENOSHA, WISCONSIN

Mill Depots: New York • Pittsburgh • Chicago • Fort Worth • Portland • Seattle • San Francisco. Distributors throughout the U.S.A.

MACWHYTE PREformed and Internally Lubricated Wire Rope | MONARCH WHYTE STRAND Wire Rope | MACWHYTE Special Traction Elevator Rope | MACWHYTE Braided Wire Rope Slings | MACWHYTE Aircraft Cables and Tie-Rods | MACWHYTE Stainless Steel Wire Rope | MACWHYTE Monel Metal Wire Rope

. . . Finished Iron and Steel Prices

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. Extras apply. Delivered prices do not reflect 3% tax on freight. (1) Mill run sheet, 10c. per lb. under base; primes 25c. above base. (2) Unassorted 8-lb. coating. (3) Widths up to 12-in. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25c. per 100 lb. to fabricators. (8) Also shafting. For quantities of 20,000 to 29,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (12) Boxed. (13) Portland and Seattle price, San Francisco 2.50c. (14) This base price for annealed, bright finish wires, commercial spring wire.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Provo, Utah	Pacific Ports, Cars[10]	DELIVERED TO Detroit	New York	Philadelphia
Hot Rolled Sheets	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢			2.65¢	2.20¢	2.34¢	2.27¢
Cold Rolled Sheets[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢			3.70¢	3.15¢	3.39¢	3.37¢
Galv. Sheets (24 gage)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢			4.05¢		3.74¢	3.67¢
Enameling Sheets (20 gage)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢			4.00¢	3.45¢	3.71¢	3.67¢
Long Ternes[3]	3.80¢	3.80¢	3.80¢										4.55¢		4.16¢	4.12¢
Hot Rolled Strip[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢			2.75¢	2.20¢	2.46¢	
Cold Rolled Strip[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)						2.90¢	3.16¢	
Cooperage Stock Strip	2.20¢	2.20¢			2.20¢		2.20¢								2.56¢	
Commodity C-R Strip	2.95¢	3.05¢		2.95¢			2.95¢	(Worcester = 3.35¢)						3.05¢	3.31¢	
Coke Tin Plate, Base Box	$5.00	$5.00	$5.00						$5.10						5.36¢	5.32¢
.50 Electro Tin Plate, Box	$4.50	$4.50	$4.50						$4.60							
.75 Electro Tin Plate, Box	$4.65		$4.65						$4.75							
Black Plate (29 gage)[5]	3.05¢	3.05¢	3.05¢						3.15¢				4.05¢[13]			3.37¢
Mfg. Ternes, Special Box	$4.30	$4.30	$4.30						$4.40							
Carbon Steel Bars	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢		2.80¢	2.25¢	2.49¢	2.47¢
Rail Steel Bars[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢		2.80¢			
Reinforcing (Billet) Bars[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢		2.55¢[13]	2.25¢	2.39¢	
Reinforcing (Rail) Bars[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢		c2.55¢[13]	2.25¢		2.47¢
Cold Finished Bars[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢	(Detroit = 2.70¢)					(Toledo = 2.80¢)			2.99¢	2.97¢
Alloy Bars, Hot Rolled	2.70¢	2.70¢				2.70¢	(Bethlehem, Massillon, Canton = 2.70¢)							2.80¢		
Alloy Bars, Cold Drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢								3.45¢		
Carbon Steel Plates	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	(Coatesville and Claymont = 2.10¢) 2.10¢	2.35¢		2.45¢	2.60¢	2.65¢	2.32¢	2.29¢	2.15¢
Floor Plates	3.35¢	3.35¢									3.70¢		4.00¢		3.71¢	3.67¢
Alloy Plates	3.50¢	3.50¢			(Coatesville = 3.50¢)						3.95¢		4.15¢		3.70¢	3.59¢
Structural Shapes	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem = 2.10¢)				2.45¢		2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R 0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)									
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)									
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)									
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)									
Bright Wire[14]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)		(Duluth = 2.65¢)				3.10¢			2.92¢
Galvanized Wire	Add proper size extra and galvanizing extra to Bright Wire base															
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)						3.70¢			3.52¢
Steel Sheet Piling	2.40¢	2.40¢				2.40¢							2.95¢			2.72¢

EXCEPTIONS TO PRICE SCHED. NO. 6

Slabs—Andrews Steel Co. $41 basing pts.; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger $37.75 f.o.b. Portsmouth, Ohio; Empire Sheet & Tin Plate Corp. $41; Phoenix Iron Co. (rerolling) $41, (forging) $47; Granite City Steel $47.50.

Blooms—Phoenix Iron Co. (rerolling) $41, (forging) $47; Pgh. Steel Co. (reroll) $38.25, (forging) $44.25. Wheeling Steel Corp. (rerolling) 4 in. sq. or larger $37.75 f.o.b. Portsmouth.

Sheet Bar—Empire Sheet & Tin Plate Co. $39 mill; Wheeling Steel Corp. $38 Portsmouth, Ohio.

Billets, Forging—Andrews Steel Co. $50 basing pts.; Follansbee Steel Corp. $49.50 Toronto; Phoenix Iron Co. $47.00 mill. Geneva Steel Co. $64.64 f.o.b. Pacific Coast; Pittsburgh Steel Co. $49.50.

Billets, Rerolling—Continental Steel Corp. may charge Acme Steel in Chicago switching area $34 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend-Lease) $41 mill; Wheeling Steel Corp., 4 in. sq. or larger $37.75, smaller $39.50 f.o.b. Portsmouth, Ohio; Stanley Works may sell Washburn Wire Co. under allocation at $39 Bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at Chicago base, f.o.b. Peoria; Phoenix Iron Co. $41 mill; Continental Steel Corp. (1¾ x 1¾) $39.50, (2 x 2) $40.60 Kokomo, Ind. (these prices include $1 size extra); Keystone Steel & Wire Co. $36.40 Peoria; Connors Steel Co. $50.69 Birmingham; Ford Motor Co. $34 Dearborn, Mich. Geneva Steel Co. $58.64 f.o.b. Pac. C. Pgh. Steel Co. $43.50.

Structural Shapes—Phoenix Iron Co. $2.35 basing pts. (export) $2.50 Phoenixville; Knoxville Iron Co. $2.30 basing points.

Rails—Sweet Steel Co. (rail steel) $50 mill; West Virginia Rail Co. (lightweight) on allocation based Huntington, W. Va.; Colorado Fuel & Iron Corp., $45 Pueblo.

Hot Rolled Plate—Granite City Steel Co. $2.65 mill; Knoxville Iron Co. $2.25 basing pts.; Kaiser Co. and Geneva Steel Co. $3.20 Pacific Ports; Central Iron & Steel Co. $2.50 basing points; Granite City Steel Co. $2.35 Granite City.

Merchant Bars—W. Ames Co., 10 tons and over, $2.85 mill; Eckels-Nye Steel Corp., $2.50 basing pts. (rail steel) $2.40; Phoenix Iron Co. $2.40 basing pts.; Sweet Steel Co. (rail steel) $2.35 mill; Joslyn Mfg. & Supply Co., $2.35 Chicago; Calumet Steel Div., Borg Warner Corp. (8 in. mill bars) $2.35 Chicago; Knoxville Iron Co. $2.30 basing pts. Laclede Steel Co., sales to LaSalle Steel granted Chicago base, f.o.b. Madison, Ill. Milton Mfg. Co. $2.75 f.o.b. Milton, Pa.

Pipe Skelp—Wheeling Steel Corp., Benwood, $2.05 per cwt.

Reinforcing Bars—W. Ames & Co., 10 tons and over, $2.85 mill; Sweet Steel Co. (rail steel) $2.35 mill; Columbia Steel Co. $2.50 Pacific Ports.

Cold Finished Bars—Keystone Drawn Steel Co. on allocation, Pittsburgh c.f. base plus c/l freight on hot rolled bars Pittsburgh to Spring City, Pa.; New England Drawn Steel Co. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to Massfield, Mass., f.o.b. Massfield; Empire Finished Steel Corp. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to plants f.o.b. plant; Compressed Steel Shafting Co. on allocation outside New England, Buffalo base plus c/l freight Buffalo to Readville, Mass. f.o.b. Readville; Medart Co. in certain areas, Chicago c.f. base plus c/l freight Chicago to St. Louis, f.o.b. St. Louis.

Alloy Bars—Texas Steel Co. for delivery except Texas and Okla. Chicago, base, f.o.b. Fort Worth, Tex.; Connors Steel Co. shipped outside Ala., Mississippi, Louisiana, Georgia, Florida, Tenn., Pittsburgh base, f.o.b. Birmingham.

Hot Rolled Strip—Joslyn Mfg. & Supply Co. $2.30 Chicago; Knoxville Iron Co. $2.25 basing pts.

Hot Rolled Sheets—Andrews Steel Co., Middletown base on shipments to Detroit or area; Parkersburg Iron & Steel Co., $2.25 Parkersburg.

Galvanized Sheets—Andrews Steel Co., $3.75 basing pts.; Parkersburg Iron & Steel Co. $3.85 Parkersburg; Apollo Steel Co. $3.75 basing pts.; Continental Steel Co., Middletown base on Kokomo, Ind., product; Superior Sheet Steel Co., Pittsburgh base except for Lend-Lease.

Pipe and Tubing—South Chester Tube Co. when priced at Pittsburgh, freight to Gulf Coast and Pacific Ports may be charged from Chester, Pa., also to points lying west of Harrisburg, Pa.

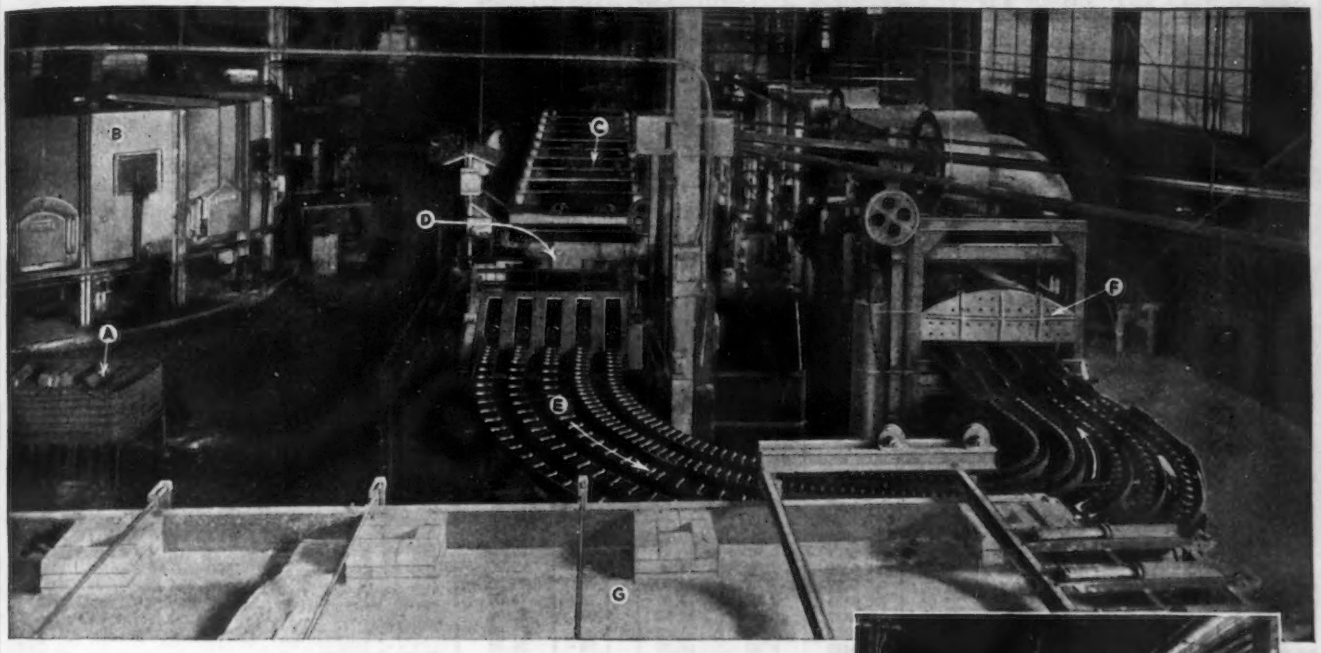
Black Sheets—Empire Sheet and Tinplate Co., maximum base price mill is $2.45 per 100 lb., with differentials, transportation charges, etc., provided in RPS. No. 6.

STEWART

THE BEST INDUSTRIAL FURNACES MADE

No. 53 OF A SERIES of Typical Installations

For NAVY'S NEW EXPANDED SHELL PROGRAM



Stewart Harden, Quench and Draw 5" Navy shell line at the Oakes Products Division of Houdaille-Hershey Corp., at Decatur, Ill. The view shows the circle conveyor taking shells from quench tank onto Draw Furnace belt. This view was taken from the new 8" Navy shell installation under construction, with roof of Stewart Hardening Furnace in foreground and, at left, the Stewart Rotary Forge for heating 5" billets.

KEY: A. *Steel billets ready for charging into Rotary Hearth Forge Furnace.* B. *Rotary Hearth Furnace.* C. *Pusher Hardening Furnace.* D. *Automatic Quench Tank.* E. *Roller U-Turn Automatic Transfer to Draw Furnace.* F. *Conveyor Recirculating Draw Furnace.* G. *Top of Pusher Type Hardening Furnace for new 8" shell line.*

New Stewart 8" shell line just prior to completion. Designed so that the 300-lb. shells need never be lifted from the line from the time they leave the heat treat until they are boxed for shipment.

The Oakes Products Division of Houdaille-Hershey Corporation has been making 5" High Explosive shells for the U. S. Navy since early in the armament program. Now, with the urgent Navy need for more big shells, this company was selected to produce the 8" type.

Because of the performance of Stewart Furnaces on the 5" shell program, and Stewart's wide experience with this type of installation, Houdaille-Hershey again turned to Stewart for additional furnaces required on the new line. For a complete description of this installation written by J. K. MacLennan, Plant Manager of the Oakes Products Division, Houdaille-Hershey Corp., write for Vol. 3 No. 7 of our "Stewart Metal Minutes."

This installation is typical of the industrial furnaces Stewart engineers are building every day, both large types to meet the specified requirements of manufacturers all over the continent, and a complete line of standard types.

Construction view of the Stewart Recirculating Conveyor Type Draw Furnace for the new 8" shell line now in operation.

STEWART INDUSTRIAL FURNACE DIVISION of CHICAGO FLEXIBLE SHAFT CO.

Main Office: 5600 W. Roosevelt Road, Chicago 50, Ill. — *Canada Factory:* (FLEXIBLE SHAFT CO., LTD.) 321 Weston Rd., So., Toronto 9

A letter, wire or 'phone call will promptly bring you information and details on STEWART furnaces, either units for which plans are now ready or units especially designed to meet your needs. Or, if you prefer, a STEWART engineer will be glad to call and discuss your heat treating problems with you.

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 8617-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-45 Ann.
**Philadelphia	3.518	4.872[8]	5.018a	3.922	4.772	3.605	3.666	3.822	4.072	5.968	7.068	7.272	8.322
New York	3.590	4.613[3]	5.010	3.974[6]	4.772	3.768	3.758	3.853	4.103	6.008	7.108	7.303	8.353
Boston	3.744	4.744[9]	5.224[9]	4.106	4.715	3.912	3.912	4.044	4.144	6.162	7.262	7.344	8.394
Baltimore	3.394	4.852	4.894	3.902	4.752	3.594	3.759	3.802	4.052	....	....	....	....
Norfolk	3.771	4.965	5.371	4.165	4.865	3.971	4.002	4.065	4.165	....	....	....	....
Chicago	3.25	4.20	5.231	3.60	4.65[17]	3.55	3.55	3.50	3.75	5.75	6.85	6.85	7.90
Milwaukee	3.387	4.337[3]	5.272[4]	3.737	4.787[17]	3.687	3.687	3.637	3.887	5.987	7.087	7.087	8.137
Cleveland	3.35	4.40	4.877[4]	3.60	4.45	3.40	3.588	3.35	3.75	5.956	7.056	6.85	7.90
Buffalo	3.35	4.40	4.75[4]	3.819	4.669	3.63	3.40	3.35	3.75	5.75	6.85	6.85	7.90
Detroit	3.45	4.50	5.00[4]	3.70	4.659[17]	3.609	3.681	3.45	3.80	6.08	7.18	7.159	8.209
Cincinnati	3.425	4.475[3]	4.825[5]	3.675	4.711	3.611	3.691	3.611	4.011	....	....	....	....
St. Louis	3.397	4.347[3]	5.172[4]	3.747	4.931[17]	3.697	3.697	3.647	4.031	6.131	7.231	7.231	8.281
Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.75	5.75	6.85	6.85	7.90
St. Paul	3.51	4.48	5.257[4]	3.86	4.35[17]	3.8113	3.8113	3.7613	4.361	6.09	7.19	7.561	8.711
Omaha	3.865	5.443	5.608[4]	4.215	....	4.165	4.165	4.115	4.43	....	....	....	....
Indianapolis	3.58	3.58	4.568	4.918	3.768	4.78	3.63	3.58	3.98	8.08	7.18	7.18	8.23
Birmingham	3.45	....	4.75	3.70	....	3.55	3.55	3.50	4.43	....	....	....	....
Memphis	3.965[7]	4.66	5.285	4.215	....	4.065	4.065	4.015	4.33	....	....	....	....
New Orleans	4.058*	4.95	5.358	4.308	....	4.158	4.158*	4.108*	4.629	....	....	....	....
Houston	3.763	5.573	6.313[1]	4.313	....	4.25	4.25	3.75	6.373[3]	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.20[3]	6.10[4]	4.95	5.813[15]	4.95	4.65	4.40	5.583	8.304	9.404	9.404	10.454
San Francisco	4.55[14]	7.30[4]	6.35[4]	4.50[14]	7.333[17]	4.65[14]	4.35[14]	4.15[14]	5.333	8.304	9.404	9.404	10.454
Seattle	4.65[12]	7.05[4]	5.95[4]	4.25[12]	....	4.75[12]	4.45[12]	4.35[12]	5.783	....	9.404	....	....
Portland	4.65[11]	6.60[4]	5.75[4]	4.75[11]	....	4.75[11]	4.45[11]	4.45[11]	5.533	8.304	9.404	8.304	9.404
Salt Lake City	4.53[17]	....	6.17[18]	5.53[17]	....	4.98[17]	4.98[17]	4.88[17]	5.90	....	....	....	....

MILL EXTRAS FOR NATIONAL EMERGENCY STEELS

Designation	Basic Open-Hearth		Electric Furnace		Designation	Basic Open-Hearth		Electric Furnace	
	Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs		Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs
NE 1330	0.10¢	$2.00	....	.....	NE 9415	0.75¢	$15.00	$1.25	$25.00
NE 1335	0.10	2.00	....	.....	NE 9417	0.75	15.00	1.25	25.00
NE 1340	0.10	2.00	....	.....	NE 9420	0.75	15.00	1.25	25.00
NE 1345	0.10	2.00	....	.....	NE 9422	0.75	15.00	1.25	25.00
NE 1350	0.10	2.00	....	.....	NE 9425	0.75	15.00	1.25	25.00
					NE 9427	0.75	15.00	1.25	25.00
					NE 9430	0.75	15.00	1.25	25.00
NE 8612	0.65¢	$13.00	$1.15	$23.00	NE 9432	0.75	15.00	1.25	25.00
NE 8615	0.65	13.00	1.15	23.00	NE 9435	0.75	15.00	1.25	25.00
NE 8617	0.65	13.00	1.15	23.00	NE 9437	0.75	15.00	1.25	25.00
NE 8620	0.65	13.00	1.15	23.00	NE 9440	0.75	15.00	1.25	25.00
NE 8622	0.65	13.00	1.15	23.00	NE 9442	0.80	16.00	1.30	26.00
NE 8625	0.65	13.00	1.15	23.00	NE 9445	0.80	16.00	1.30	26.00
NE 8627	0.65	13.00	1.15	23.00	NE 9447	0.80	16.00	1.30	26.00
NE 8630	0.65	13.00	1.15	23.00	NE 9450	0.80	16.00	1.30	26.00
NE 8632	0.65	13.00	1.15	23.00					
NE 8635	0.65	13.00	1.15	23.00					
NE 8637	0.65	13.00	1.15	23.00	NE 9722	0.65¢	$13.00	$1.15	$23.00
NE 8640	0.65	13.00	1.15	23.00	NE 9727	0.65	13.00	1.15	23.00
NE 8642	0.65	13.00	1.15	23.00	NE 9732	0.65	13.00	1.15	23.00
NE 8645	0.65	13.00	1.15	23.00	NE 9737	0.65	13.00	1.15	23.00
NE 8647	0.65	13.00	1.15	23.00	NE 9742	0.65	13.00	1.15	23.00
NE 8650	0.65	13.00	1.15	23.00	NE 9745	0.65	13.00	1.15	23.00
					NE 9747	0.65	13.00	1.15	23.00
					NE 9750	0.65	13.00	1.15	23.00
NE 8712	0.70¢	$14.00	$1.20	$24.00	NE 9763	0.65	13.00	1.15	23.00
NE 8715	0.70	14.00	1.20	24.00	NE 9768	0.65	13.00	1.15	23.00
NE 8717	0.70	14.00	1.20	24.00					
NE 8720	0.70	14.00	1.20	24.00					
NE 8722	0.70	14.00	1.20	24.00	NE 9830	$1.30	$26.00	$1.80	$36.00
NE 8725	0.70	14.00	1.20	24.00	NE 9832	1.30	26.00	1.80	36.00
NE 8727	0.70	14.00	1.20	24.00	NE 9835	1.30	26.00	1.80	36.00
NE 8730	0.70	14.00	1.20	24.00	NE 9837	1.30	26.00	1.80	36.00
NE 8732	0.70	14.00	1.20	24.00	NE 9840	1.30	26.00	1.80	36.00
NE 8735	0.70	14.00	1.20	24.00	NE 9842	1.30	26.00	1.80	36.00
NE 8737	0.70	14.00	1.20	24.00	NE 9845	1.30	26.00	1.80	36.00
NE 8740	0.70	14.00	1.20	24.00	NE 9847	1.30	26.00	1.80	36.00
NE 8742	0.70	14.00	1.20	24.00	NE 9850	1.30	26.00	1.80	36.00
NE 8745	0.70	14.00	1.20	24.00					
NE 8747	0.70	14.00	1.20	24.00					
NE 8750	0.70	14.00	1.20	24.00	NE 9912	$1.20	$24.00	$1.55	$31.00
					NE 9915	1.20	24.00	1.55	31.00
					NE 9917	1.20	24.00	1.55	31.00
NE 9255	0.40¢	$8.00	....	.....	NE 9920	1.20	24.00	1.55	31.00
NE 9260	0.40	8.00	....	.....	NE 9922	1.20	24.00	1.55	31.00
NE 9261	0.65	13.00	....	.....	NE 9925	1.20	24.00	1.55	31.00
NE 9262	0.65	13.00	....	.....					
					NE 52100A	....	.....	$2.60	$52.00
					NE 52100B	....	.....	2.60	52.00
					NE 52100C	....	.....	2.60	52.00

Note 1: The ranges shown are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under, with a maximum individual piece weight of 7000 lb. irrespective of size. **Note 2:** For steels ordered to such ranges, below the size and weight restriction, the average of all the chemical checks must be within the limits specified subject to check analysis variations given in Table 4, Section 10, A.I.S.I. Steel Products Manual. **Note 3:** When acid open-hearth is specified and acceptable, add to basic open-hearth alloy differential 0.25c. per lb. for bars and bar strip and $5 per gross ton for billets, blooms and slabs. **Note 4:** The extras shown are in addition to the base price of $2.70 for 100 lb. on finished products and $54 per gross ton on semi-finished steel, major basing points, and are in cents per pound when applicabale to bars and bar-strip, and in dollars per gross ton when applicable to billets, blooms and slabs. The full extra applicable over the base price is the total of all extras indicated by the specific requirements of the order. The higher extra shall be charged for any size falling between two published extras.

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD ROLLED: Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1500 lb. base; NE alloy bars, 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 1999 lb. (7) 400 to 1999 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over.

(a) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Add 0.271c. for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports**)

	Per Gross Ton
Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

PRICES

SEMI-FINISHED STEEL

Ingots, Carbon, Rerolling

Base per gross ton, f.o.b. mill.... $31.00

Exceptions: Phoenix Iron Co. may charge $38.75; Kaiser Co., $43.00 f.o.b. Pacific Coast Ports; Empire Sheet & Tinplate Co., $34.25. Pgh. Steel Co. $33.10.

Ingots, Carbon, Forging

Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown $36.00

Exceptions: Phoenix Iron Co. may charge $43.00; Empire Sheet & Tinplate Co., $39.25, f.o.b. Mansfield, Ohio; West Coast producers, $48.00, f.o.b. Pacific Coast Ports. Pgh. Steel Co. $38.10.

Ingots, Alloy

Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh $45.00

Exceptions: C/L delivered Detroit add $2.00; delivered East Michigan add $3.00. Connors Steel Co. may charge $45.00 f.o.b. Birmingham.

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.00 higher; delivered E. Michigan, $3 higher; f.o.b. Duluth, billets only, $2.00 higher; billets f.o.b. Pacific ports are $12 higher. Provo, $11.20 higher. Delivered prices do not reflect three per cent tax on freight rates.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

For exceptions on semi-finished steel see the footnote on the page of finished steel prices.

Alloy Billets, Blooms, Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton 54.00

Price delivered Detroit $2.00 higher; E. Michigan $3.00 higher.

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.00 higher; E. Michigan, $3 higher.

Price Exception: Follansbee Steel Corp. permitted to sell at $13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of $52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

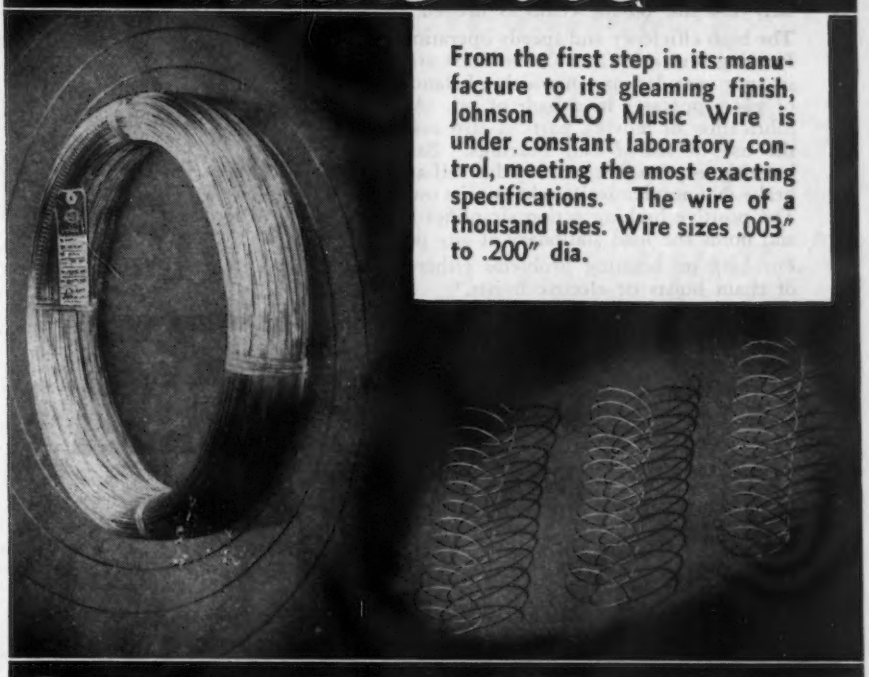
TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 3c. higher.

JOHNSON XLO *Music Wire*

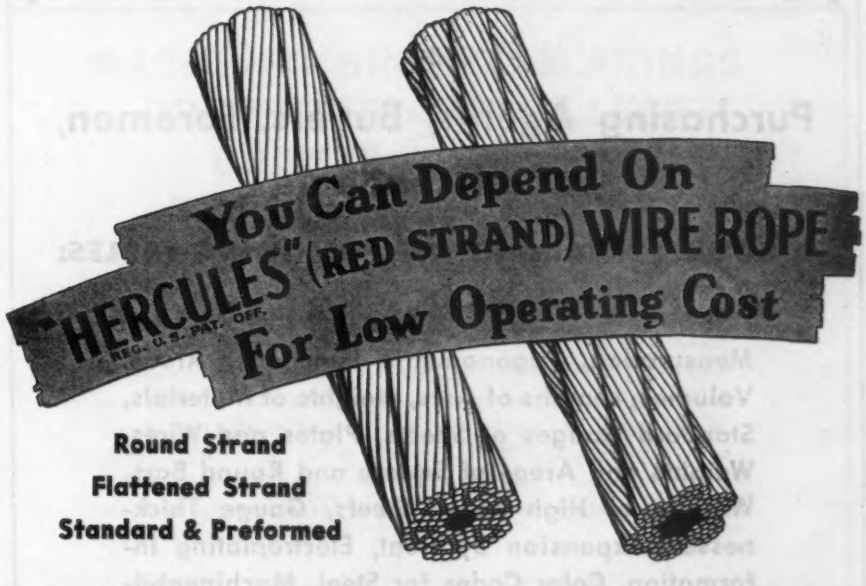


From the first step in its manufacture to its gleaming finish, Johnson XLO Music Wire is under constant laboratory control, meeting the most exacting specifications. The wire of a thousand uses. Wire sizes .003" to .200" dia.

JOHNSON STEEL & WIRE CO., INC.

WORCESTER 1, MASSACHUSETTS

NEW YORK ATLANTA AKRON CHICAGO LOS ANGELES



Round Strand
Flattened Strand
Standard & Preformed

WHY not let "HERCULES" (Red-Strand) Wire Rope help you meet present day production requirements and still maintain a reasonable margin of profit? You will quickly discover that "HERCULES" is a dependable ally—not only in today's fight against increasing operating costs—but also in your endeavor to speed up production.

Made Only By **A. LESCHEN & SONS ROPE CO.** *Established 1857*

5909 Kennerly Avenue, St. Louis 12, Mo.

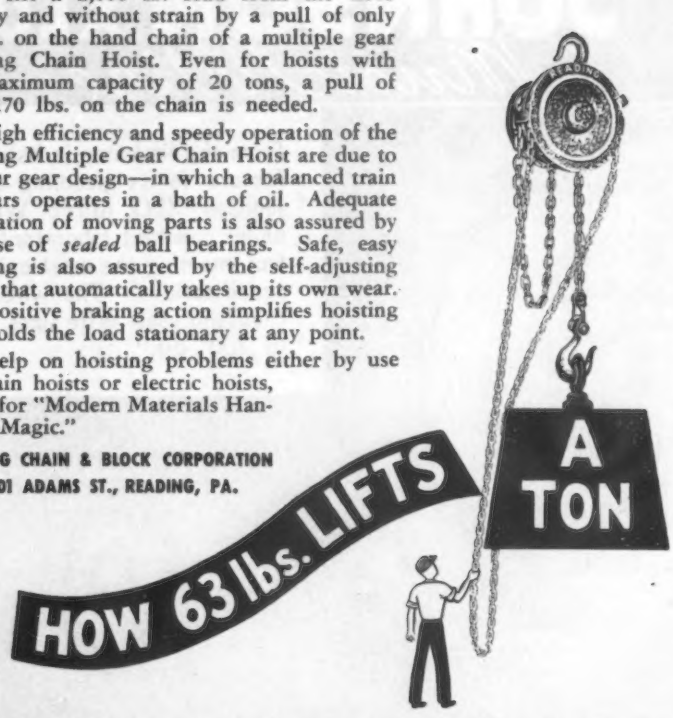
New York • Chicago • Denver • San Francisco • Seattle • Portland

You lift a 2,000 lb. load from the floor quickly and without strain by a pull of only 63 lbs. on the hand chain of a multiple gear Reading Chain Hoist. Even for hoists with the maximum capacity of 20 tons, a pull of only 170 lbs. on the chain is needed.

The high efficiency and speedy operation of the Reading Multiple Gear Chain Hoist are due to its spur gear design—in which a balanced train of gears operates in a bath of oil. Adequate lubrication of moving parts is also assured by the use of *sealed* ball bearings. Safe, easy hoisting is also assured by the self-adjusting brake that automatically takes up its own wear. The positive braking action simplifies hoisting and holds the load stationary at any point.

For help on hoisting problems either by use of chain hoists or electric hoists, write for "Modern Materials Handling Magic."

READING CHAIN & BLOCK CORPORATION
2101 ADAMS ST., READING, PA.



CHAIN HOISTS • ELECTRIC HOISTS • OVERHEAD TRAVELING CRANES

READING HOISTS

★ ★

For

Purchasing Agents, Buyers, Foremen, Superintendents

A BOOK CONTAINING THE FOLLOWING TABLES:

(Size 5½ x 8½)

Mensuration, Trigonometric Functions, Areas, Volumes, Lengths of Arcs, Weights of Materials, Standard Gauges of Sheets, Plates and Wires, Weights and Areas of Square and Round Bars, Weights of High Speed Steels, Gauge Thicknesses, Expansion by Heat, Electroplating Information, Color Codes for Steel, Machineability Ratings, Hardness Conversion Charts, Cutting Speeds, etc.

Send your request to

GENERAL REFINERIES, INC.

27 NORTH 4TH STREET, MINNEAPOLIS 1, MINN.
P. O. BOX 1124

★ ★

PRICES

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
(F.o.b. Pittsburgh only on wrought pipe)
Base Price—$200.00 per Net Ton

	Black	Galv.
Steel (Butt Weld)		
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½
Wrought Iron (Butt Weld)		
½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18
Steel (Lap Weld)		
2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½
Wrought Iron (Lap Weld)		
2 in.	30½	13
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17
Steel (Butt, extra strong, plain ends)		
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57
Wrought Iron (Same as Above)		
½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½
Steel (Lap, extra strong, plain ends)		
2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56
Wrought Iron (Same as Above)		
2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle.	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are $45 at Birmingham and $53.80 delivered Chicago, $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes, Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

			Seamless Cold Drawn	Hot Rolled	Lap Weld, Hot Rolled
2	in. o.d.	13 B.W.G.	15.03	13.04	12.38
2½	in. o.d.	12 B.W.G.	20.31	17.54	16.58
3	in. o.d.	12 B.W.G.	22.48	19.50	18.35
3½	in. o.d.	11 B.W.G.	28.37	24.62	23.15
4	in. o.d.	10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft., and over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

PRICES

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
	Base per Keg	
Standard wire nails.....	$2.55	$3.05
Coated nails	2.55	3.05
Cut nails, carloads	3.85	....
	Base per 100 Lb.	
Annealed fence wire	$3.05	$3.55
Annealed galv. fence wire	3.40	3.90
	Base Column	
Woven wire fence*	$0.67	$0.85
Fence posts, carloads ...	.69	.86
Single loop bale ties ...	.59	.84
Galvanized barbed wire**	.70	.80
Twisted barbless wire ..	.70	....

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

Base discount less case lots

	Per Cent Off List
⅛ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:
(Hexagon or Square)

⅛ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts *Base discount less keg lots*	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
⅛ in. and smaller	62	..
⅛ in. through 1 in.	..	60
9/16 in. to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full keg lots, 10 per cent additional discount.

Stove Bolts *Consumer*

Packages, nuts loose .....71 and 10
In packages, with nuts attached 71
In bulk 80

On stove bolts freight allowed up to 65c per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets
(½ in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.75

Small Rivets
(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham .....65 and 5

Cap and Set Screws *Consumer*
Per Cent Off List

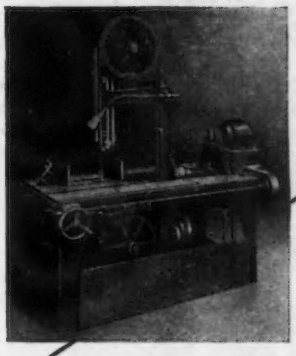
Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65c per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C. ...	$6.00	$12.00
15-lb. coating I.C. ...	7.00	14.00
20-lb. coating I.C. ...	7.50	15.00



No other saw can do as much!

No Other Saw Can Do As Much!
MARVEL Universal Band Saw, 18" x 18" capacity, will cut-off, slot, trim, mitre, notch, rough-out, or split bar stock, pipe, structural sections, mouldings, tubing large standard blocks, or small irregular shapes, with speed, ease, and convenience. Few shops working with metal can afford to be without this most versatile of all saws.

MARVEL SAWS

Complete Range of Metal Sawing Machines
Being the largest exclusive manufacturer of metal sawing machines and blades, both hack saw and band saw type, we have the correct answer to your cut-off problems. Each MARVEL model has a distinct application, so write us and we will send our catalog, price and recommendation for the saw to fill your requirements most efficiently. MARVEL sawing engineers are also available to discuss and analyze your cut-off work. (Without obligation of course)

Mitre cutting is simple and accurate with the MARVEL Series 8 Band Saw. No change in position of work. Simply set the saw column at any required angle up to 45° either right or left of vertical. Do not confuse with any other "band saw." There is no other machine like the No. 8 MARVEL.

ARMSTRONG-BLUM MFG. CO.
5700 W. Bloomingdale Ave., Chicago 39, Illinois, U. S. A.

MACHINED BRONZE BEARINGS
GRAPHITED AND OILLESS
BRONZE BEARINGS
BRONZE GEAR BLANKS
MACHINED BRONZE PARTS

S & H Bronze Bearings are made of cast bronze, under the most modern conditions and of specifications to meet the most exacting requirements. We are manufacturers of plain bronze and graphited and oilless bronze bearings for all branches of the Government Services, as well as plain cylinder type, single and double flange, thrust washers, from ⅜" in diameter to 20" in diameter. We also manufacture special parts made of cast bronze. Our manufacturing methods and equipment enable us to meet the most exacting machining specifications.

If it's Bronze BETTER B BEARINGS *We make it*

INDUSTRIAL BEARINGS

S. & H. Bearing and Manufacturing Co.
340-344 North Avenue, East
Cranford New Jersey

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima. Delivered prices do not reflect 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston	*$25.50*	*$25.00*	*$26.50*	*$26.00*	.....	.....
Brooklyn	*27.50*	*27.00*		*28.00*	.....	.....
Jersey City	*26.53*	*26.03*	*27.53*	*27.03*	.....	.....
Philadelphia (4)	*25.84*	*25.34*	*26.84*	*26.34*	*$30.74*	.....
Bethlehem, Pa.	25.00	24.50	26.00	25.50	.....	.....
Everett, Mass.	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.		24.50			29.50	.....
Birdsboro, Pa. (3)	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50			.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa. (1)	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati, Ohio	*25.11*	*24.61*	.....	*25.11*	.....	.....
Canton, Ohio	*25.39*	*24.89*	*25.89*	*25.39*	*32.69*	.....
Mansfield, Ohio	*25.94*	*25.44*	*26.44*	*25.94*	*32.86*	.....
St. Louis	*24.50*	*24.50*	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	*35.46*	.....*$37.34*
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	*32.42*	.....
Hamilton, Ohio	24.00	23.50		24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown	24.00	23.50	24.50	24.00	*32.42*	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc.	.....	.....	.....	.....	.....	34.00
Lyles, Tenn. fc. (2	.....	.....	.....	.....	.....	33.00
St. Paul	*26.63*	26.13	*27.13*	*26.63*	*39.80*	.....
Duluth	24.50	24.00	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	*26.95*	.....	.....	.....	.....	.....
San Francisco	*26.95*	.....	.....	.....	.....	.....
Seattle	*26.95*	.....	.....	.....	.....	.....
Provo, Utah	22.00	21.50	.....	.....	.....	.....
Montreal	*27.50*	*27.50*	.....	*28.00*	.....	.....
Toronto	*25.50*	*25.50*	.....	*26.00*	.....	.....

GRAY FORGE IRON: Valley or Pittsburgh furnace $23.50

(1) Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable. Struthers Iron and Steel Co. may add another $1.00 per gross ton for iron from Struthers, Ohio, plant.

(2) Price shown is for low-phosphorous iron; high phosphorous sells for $28.50 at the furnace.

(3) E. & G. Brooke Co. Birdsboro, Pa. permitted to charge $1.00 per ton extra.

(4) Pittsburgh Ferromanganese Co. (Chester furnace only) may charge $2.31 a ton over maximum basing point prices.

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and $1 per ton extra for each additional 0.25 per cent nickel.

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, c. per lb., ton lots.

Copper, electrolytic, 150 and 200 mesh	21½ to 23½c.
Copper, reduced, 150 and 200 mesh	20½ to 25½c.
Iron, commercial, 100 and 200 mesh, 96 + % Fe	13½ to 15c.
Iron, crushed, 200 mesh and finer, 90 + % Fe, carload lots	40.
Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe, drum lots	63c.
Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe	30 to 33c.
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	42c.
Iron, carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90c.
Aluminum, 100 and 200 mesh.*	23 to 27c.
Antimony, 100 mesh	20.6c.
Cadmium, 100 mesh	$1
Chromium, 150 mesh	$1.03
Lead, 100, 200 & 300 mesh, 11½ to	12½c.
Manganese, 150 mesh	51c.
Nickel, 150 mesh	51½c.
Solder powder, 100 mesh, 8½c. plus metal	
Tin, 100 mesh	58¾c.
Tungsten metal powder, 98%-99%, any quantity, per lb.	$2.60
Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb.	$2.60
Under 100 lb.	$3.00

*Freight allowed east of Mississippi.

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$7.00*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	8.35
Foundry, By-Product	
Chicago, del'd	13.38
Chicago, f.o.b.	12.60
New England, del'd	14.25
Kearny, N. J., f.o.b.	12.65
Philadelphia, del'd	12.88
Buffalo, del'd	13.00
Portsmouth, Ohio, f.o.b.	11.10
Painesville, Ohio, f.o.b.	11.75
Erie, del'd	12.75
Cleveland, del'd	12.80
Cincinnati, del'd	12.85
St. Louis, del'd	13.35
Birmingham, del'd	10.50

*Hand drawn ovens using trucked coal permitted to charge $7.75 per ton plus transportation charges. **Mo., Ala., and Tenn. producers—$13.35.

SHELDON

Wherever our Armies go, SHELDON LATHES move with them for they are basic equipment in the Army's Mobile Machine Shops and Mobilized Instrument Repair Shops.* These compact truck-mounted machine shops are found wherever the going is toughest for it is their job to keep all mechanized ordnance operating efficiently. It's a big assignment, and we are proud that SHELDON Precision Lathes are selected to handle it.

Write for Catalog

* SHELDON Lathes are also standard in the Marine Corps Mobile Shop Trailers and on many Naval Craft.

SHELDON MACHINE CO., Inc.
4240 N. Knox Ave. Chicago 41, U.S.A.

PRICES

REFRACTORIES
(F.o.b. Works)

	Per 1000
Fire Clay Brick	
Super-duty brick, St. Louis	$64.60
First quality, Pa., Md., Ky., Mo., Ill.	51.30
First quality, New Jersey	56.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	46.55
Second quality, New Jersey	51.00
No. 1, Ohio	43.00
Ground fire clay, net ton	7.60
Silica Brick	
Pennsylvania and Birmingham	$51.30
Chicago District	58.90
Silica cement, net ton (Eastern)	9.00
	Per Net Ton
Chrome Brick	
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$54.00
Magnesite Brick	
Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00
Grain Magnesite	
Domestic, f.o.b. Balt. and Chester in sacks (carloads)	$43.48
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

RAILS, TRACK SUPPLIES
(F.o.b. Mill)

Standard rails, heavier than 60 lb., No. 1 O.H., gross ton	$40.00
Angle splice bars, 100 lb.	2.70
(F.o.b. Basing Points)	*Per Gross Ton*
Light rails (from billets)	$40.00
Light rails (from rail steel)	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25c.

CORROSION AND HEAT-RESISTING STEEL
(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hot strip	17.00c.	17.50c.	24.00c.	35.00c.
Cold strip	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

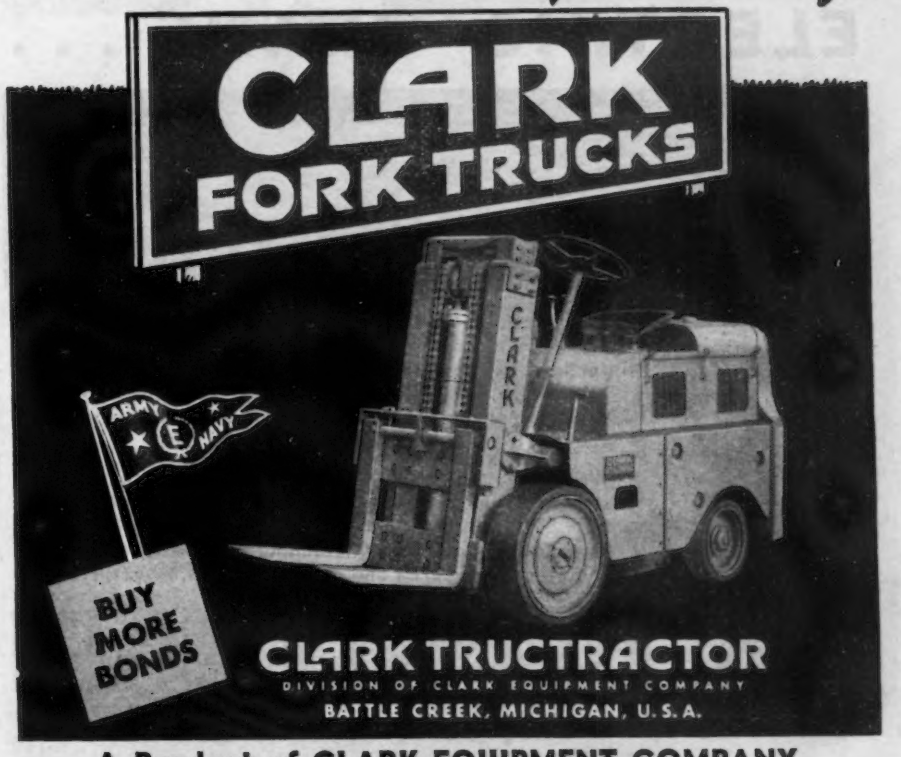
*Includes annealing and pickling.

ELECTRICAL SHEETS
(Base, f.o.b. Pittsburgh)

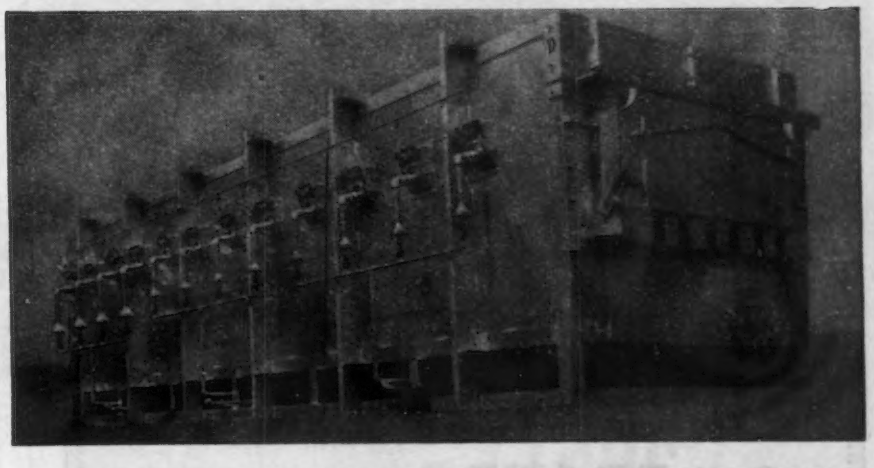
	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

You can STRETCH MANPOWER by using



A Product of CLARK EQUIPMENT COMPANY



BELLEVUE FURNACES
are designed for the job.

In the construction of Bellevue Furnaces, painstaking consideration of the job to be done comes first. Every factor must be evaluated, every condition studied. Only then do Bellevue engineers attempt design and recommendation of furnace type.

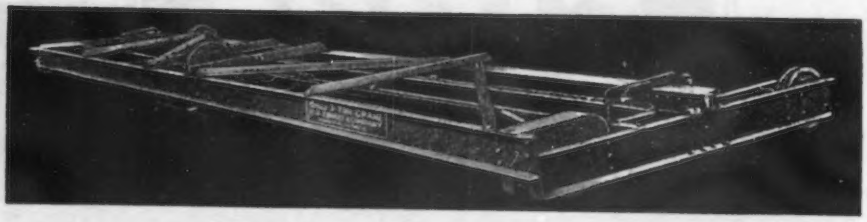
The soundness of that policy is being demonstrated in plant after plant. Hundreds of executives in scores of varied companies have proved, to their own satisfaction, the efficiency, speed, high production level and operating economies of Bellevues that were "designed" for the job.

You, too, will find Bellevue experience and facilities a profitable investment for your own furnace needs.

Send for full details.

BELLEVUE INDUSTRIAL FURNACE CO.
2974 BELLEVUE AVENUE DETROIT, MICH.

CONCO 3-Motor Single Girder CAB OR FLOOR OPERATED ELECTRIC CRANE . . .



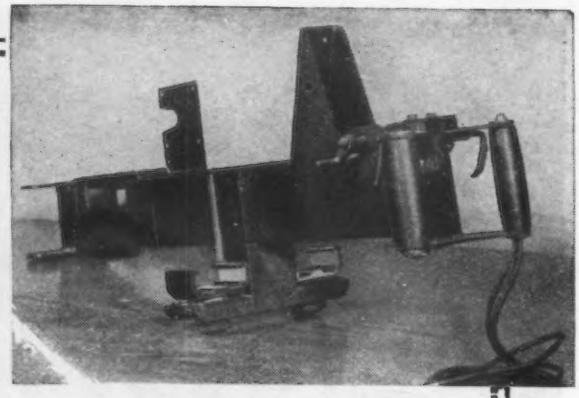
● **Available in capacities of one through five tons for floor or cab operation. Simply, ruggedly designed for low first cost and maintenance. Used with Low Headroom Type Hoist, provides for maximum space coverage horizontally and vertically. Effective in even a minimum space. Write for Bulletin 2000.**

Write for Bulletin 26000 describing the Torpedo Hoist shown. Three capacities 250 lb. — $139.50, 500 lb. — $149.50, 1000 lb. — $159.50. Heavily, simply built, with Push Button Control. Outstanding in CONCO'S complete line of hand-powered and electric Cranes, Hoists, Trolleys.

CONCO ENGINEERING WORKS

Div. of H. D. Conkey & Co. — 15 Grove St. — Mendota, Ill.

Builders Of Conco Torpedo Electric Hoist



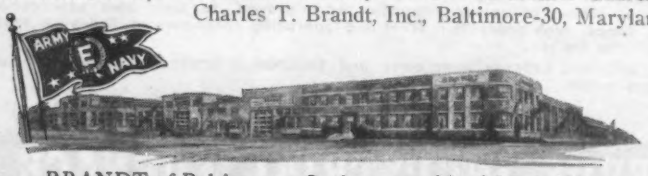
GUN ADAPTER, for synchronizing machine guns and aerial camera . . . built by Brandt of high-tensile stainless steel . . . by stamping and welding processes . . . for use on Martin Marauders.

Small Parts or Big Installations—

Call BRANDT of Baltimore

for Precision in Heavy Plate and Sheet Steel Work

Here is an 8½ acre plant . . . with the most modern equipment for shearing, rolling, forming, welding and completely fabricating ferrous, non-ferrous and alloy metals to your specifications . . . from the lightest gauge up to and including 1¼" mild steel or ¾" armor plate. Extensive war contracts necessarily limit our present acceptance of new business for immediate delivery. For information address: Charles T. Brandt, Inc., Baltimore-30, Maryland.



BRANDT of Baltimore—*Craftsmen in Metal Since 1890*

PRICES

Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Bethlehem, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Carload lots (packed)	141.00
Less ton lots (packed)	148.50

Premium, $1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Manganese Metal

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.

96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	36c.
L.c.l. lots	38c.

95-97% Mn, .2% max. C, 1.5% max. Si, 2.5% max. Fe.

Carload, bulk	34c.
L.c.l. lots	35c.

Spiegeleisen

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$35.00	$36.00
Less ton	47.50	48.50

Electric Ferrosilicon

OPA maximum base price cents per lb contained Si, lump size in carlots, f.o.b. shipping point with freight allowed to destination.

	Eastern Zone	Central Zone	Western Zone
50% Si	6.65c.	7.10c.	7.25c.
75% Si	8.05c.	8.20c.	8.75c.
80-90% Si	8.90c.	9.05c.	9.55c.
90-95% Si	11.05c.	11.20c.	11.65c.

Spot sales add: .45c. per lb. for 50% Si, .3c. per lb. or 75% Si .25c. per lb for 80-90% and 90-95% Si.

Silvery Iron

(C/L, Per Gross Ton, base 6.00 to 6.50 Si)

F.o.b. Jackson, Ohio	$29.50*
Buffalo	30.75*

For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorous or over.

*OPA price established 6-24-41.

Bessemer Ferrosilicon

Prices are $1 a ton above silvery iron quotations of comparable analysis.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe.	13.10c.	13.55c.	16.50c.
97% Si, 1% Fe.	13.45c.	13.90c.	16.80c.

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	3.35c.	3.50c.	3.65c.
2000 lb.-carload	3.8c.	4.3c.	4.25c.

Silicomanganese

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05c.
2000 lb. to carload	6.70c.
Under 2000 lb.	6.90c.
Briquets, contract, basis carlots, bulk freight allowed, per lb.	5.80c.
2000 lb. to carload	6.30c.
Less ton lots	6.55c.

Ferrochrome

(65-72% Cr, 2% max. Si)

OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

	Eastern Zone	Central Zone	Western Zone
0.06% C	23.00c.	23.40c.	24.00c.
0.10% C	22.50c.	22.90c.	23.50c.
0.15% C	22.00c.	22.40c.	23.00c.
0.20% C	21.50c.	21.90c.	22.50c.
0.50% C	21.00c.	21.40c.	22.00c.
1.00% C	20.50c.	20.90c.	21.50c.
2.00% C	19.50c.	19.90c.	21.00c.
66-71% Cr, 4-10% C	13.00c.	13.40c.	14.00c.

Other Ferroalloys

Ferrotungsten, Standard grade, lump or ¼X down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, Pa., per lb. contained tungsten, 10,000 lb. or more... $1.90

Ferrovanadium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va.
- Open Hearth $2.70
- Crucible $2.80
- Primos $2.90

Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal..... $1.50

Vanadium pentoxide, 88%-92% V_2O_5 technical grade, contract basis, any quantity, per lb. contained V_2O_5. Spot sales add 5c. per lb. contained V_2O_5..... $1.10

Ferroboron, contract basis, 17.50% min. Bo, f.o.b. producer's plant with usual freight allowances, per lb. of alloy.
- 2000 lb. to carload..... $1.20
- Under 2000 lb..... 1.30

Silcaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)
- Carload lots ..... 25c.
- 2000 lb. to carload..... 26c.

Silvaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)
- Carload lots ..... 58c.
- 2000 lb. to carload..... 59c.

Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis
- No. 1 ..... 87.5c.
- No. 6 ..... 60c.
- No. 79 ..... 45c.

Bortram, f.o.b. Niagara Falls
- Ton lots, per lb..... 45c.
- Less ton lots, per lb..... 50c.

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Cb.
- 2000 lb. lots $2.25
- Under 2000 lb. lots $2.30

Ferrotitanium, 40%-45%, f.o.b. 0.10c. max. Niagara Falls, N. Y., ton lots, per lb. contained Ti.. $1.23
- Less ton lots $1.25

Ferrotitanium, 20%-25%, 0.10 C max., ton lots, per lb. contained titanium $1.35
- Less ton lots $1.40

High-carbon ferrotitanium, 15%-18%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per carload $142.50

Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton $58.50

Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton $75.00

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per lb. contained Mo. 95c.

Calcium molybdate, 40%-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained Mo. ..... 80c.

Molybdenum oxide briquetes, 48%-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo ..... 80c.

Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo ..... 80c.

Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add ¼c. for spot sales
- Carload lots ..... 14c.

Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per lb. of alloy
- Carload, bulk ..... 4.6c.

Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk ..... 5.75c.
- Ton lots ..... 7.25c.

Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.
- Car lots ..... 8.75c.
- Ton lots ..... 9.25c.

ERIE BUCKETS

- General Purpose
- Dredging and Hard Digging
- Dragline
- Material Handlers
- Hook-on Type
- Ore Handling
- Coal and Coke
- 4-Rope
- Barge Type
- Strayer Electric

THE COMPLETE LINE

Write for Data

Above types built in weights and capacities to suit your crane and job requirements.

ERIE STEEL CONSTRUCTION CO.

ERIE, PENNSYLVANIA

Aggre Meters • Buckets • Concrete Plants • Traveling Cranes

FOR ALL TYPES of INDUSTRIAL FURNACES

OIL BURNERS for OPEN HEARTHS

Fig. P-813-L

The Type S. A. Model QH Oil Burner provides the ideal flame for firing open hearth furnaces with any grade of fuel oil or tar, using saturated or superheated steam, or compressed air for atomization.

Its venturi throat and internal mixing chamber (see illustration below) permits a wide range in capacity and flame velocity. Steam consumption is low. Continuous operation without clogging or need for cleaning.

Nozzle is extendable, with or without water cooled jacket. Sizes available to give capacities up to 725 gallons per hour.

For more information about these burners write for Bulletin No. 21.

NATIONAL AIROIL FUEL OIL - GAS BURNERS

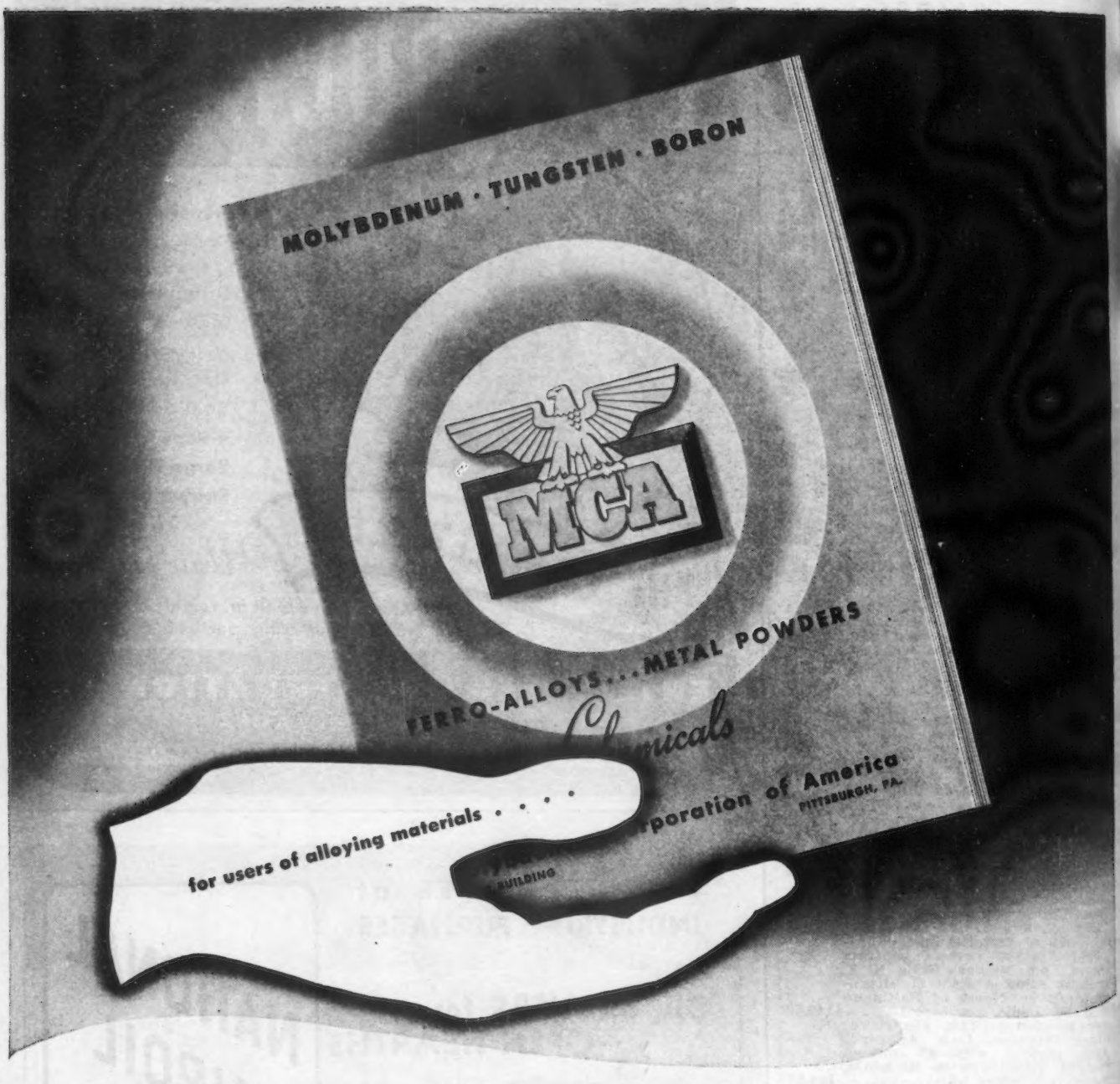
Steam Atomizing Oil Burners—Mechanical Pressure Atomizing Oil Burners—Low Air Pressure Oil Burners—Motor-driven Rotary Oil Burners—Industrial Gas Burners—Combination Gas and Oil Burners—Fuel Oil Pumping Units—Fuel Oil Heaters—Fuel Oil Strainers and other accessories.

Cross Section of Type SA Oil Burner

NATIONAL AIROIL BURNER COMPANY, INCORPORATED

1271 East Sedgley Ave., Philadelphia 34, Pa.

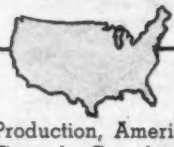
ESTABLISHED 1912 *INCORPORATED 1917*



the Molybdenum Corporation offers you

a new catalog

Molybdenum, Tungsten, and Boron, in their industrially useful and available forms, and chemical compounds of these elements, are the subjects treated of in the new catalog of the Molybdenum Corporation. Users or potential users of such products are likely to find the book of interest. Write for your copy.



AMERICAN Production, American Distribution, American Control—Completely Integrated.
Offices: Pittsburgh, New York, Chicago, Detroit, Los Angeles, San Francisco, Seattle.
Sales Representatives: Edgar L. Fink, Detroit; H. C. Donaldson & Co., Los Angeles, San Francisco, Seattle.
Works: Washington, Pa.; York, Pa.
Mines: Questa, N. M.; Yucca, Ariz.; Urad, Colo.

MOLYBDENUM CORPORATION OF AMERICA
GRANT BUILDING PITTSBURGH, PA.

MCA